Vol. IV AUGUST, 1919 No. 11

GENERAL LIBRARY
AUG 23 1919
UNIV. OF MICH.

The Journal of Laboratory and Clinical Medicine

VICTOR C. VAUGHAN, M.D., Editor-in-Chief
University of Michigan, Ann Arbor

ASSOCIATE EDITORS

Pharmacology
DENNIS E. JACKSON, M.D.
University of Cincinnati

Bacteriology
HANS ZINSSER, M.D.
Columbia University, New York

Immunology and Serology
FREDERICK P. GAY, M.D.
University of California, Berkeley

Physiological Pathology
PAUL G. WOOLLEY, M.D.
University of Cincinnati, Cincinnati

Physiological Chemistry and Clinical Physiology
J. J. R. MACLEOD, M.B.
University of Toronto, Toronto

ROY G. PEARCE, M.D.
Lakeside Hospital, Cleveland

Clinical Pathology
W. C. MacCARTY, M.D.
Mayo Clinic, Rochester, Minn.

Neuropathology
E. E. SOUTHARD, M.D.
Harvard University, Boston

Tuberculosis
GERALD B. WEBB, M.D.
Cragmor Sanatorium, Colorado Springs

Published by
THE C. V. MOSBY COMPANY
ST. LOUIS

$3.00 Per Annum Single Copies, 50 Cents

Bacteriologic Peptone

Meets every need for a standard peptone

BACTERIOLOGIC PEPTONE, P. D. & CO., is an American-made product that is proving its excellence in all requirements of the biological and bacteriological laboratory. Its use in the production of diphtheria and tetanus toxins, vaccines, sera, etc., is commended by the highest authorities.

BACTERIOLOGIC PEPTONE, P. D. & CO., has demonstrated its efficiency in the cultivation of organisms and in the various formulæ in which a standard peptone is necessary. It is used in the biologic analysis of milk, water, foods and soil, in public-health work, and in standardization of disinfectants.

BACTERIOLOGIC PEPTONE, P. D. & CO., is ***uniform in composition, readily and completely soluble, correct in chemical structure.***

Literature and quotations will be promptly supplied on request.

DETROIT, MICHIGAN,
U. S. A.

Parke, Davis & Co.

The Journal of Laboratory and Clinical Medicine

VOL. IV. ST. LOUIS, AUGUST, 1919 NO. 11

ORIGINAL ARTICLES

COMMUNICABLE DISEASE IN THE UNITED STATES ARMY DURING THE SUMMER AND AUTUMN OF 1918.*

BY COL. VICTOR C. VAUGHAN, M.C., U.S.A., AND CAPT. GEORGE T. PALMER, S.C., U.S.A., WASHINGTON, D. C.

Section III

DISTRIBUTION OF DEATHS AND DISEASE AMONG THE ARMY CAMPS

EXPLANATORY NOTE: There are two sources of statistical data upon which the authors have drawn in making up the tables and discussions which follow. One of these is the weekly telegraphic report which is sent in from each camp and post to the Surgeon General. The other is the special reports prepared by camp officers, and forwarded from time to time to the Surgeon General. The latter source of information is more accurate because there has been time to check over the weekly reports and correct errors which are bound to creep in. These errors arise from the fact that diagnoses are changed and that the reports at times include records from the base hospital, at other times do not include them, and at still other times hospital records are counted twice in making up the consolidated report.

For the summer season and likewise for the autumn, except for certain diseases, the two sets of records agree closely. During the autumn, however, the influenza epidemic upset the statistical work in many camps, and in preparing this report we have been confronted by huge discrepancies between the

*A report from the Section of Communicable Diseases, Division of Laboratories and Infectious Disease, prepared under the direction of Col. Frederick F. Russell, and published by permission of the Surgeon General. The writers are printing this as a preliminary report, subject to revision on the receipt of further data and will be grateful to all medical officers for more exact information on matters which came under their observation.

records furnished by the weekly telegraphic reports and the records sent in later by the epidemiologists. As an illustration we submit the following outline: "W. T." referring to the weekly telegraphic reports and "E" meaning the record sent in by the epidemiologist.

CAMP	CASES OF INFLUENZA		CASES OF PNEUMONIA		DEATHS FROM INFLUENZA AND PNEUMONIA	
	W. T.	E.	W. T.	E.	W. T.	E.
Cody	3006	3296	182	823	231	248
Forrest	910	2764	221	527	95	178
MacArthur	8319	7624	479	755	195	200
Dodge	10222	10751	1482	2263	739	856
Pike	14412	12811	969	1824	460	458
Wadsworth	577	1520	717	815	182	—

Pike explains the discrepancy in pneumonia records by the fact that the weekly telegraphic reports were based on records from the base hospital and it was later found that these did not include bronchopneumonia (in accordance with an old order to that effect), while the daily reports covered all pneumonias.

Wadsworth first carried influenza cases as streptococcic infections, which explains the low number under W. T. Later these were all included as influenza.

The discrepancies are usually to be traced to lack of cooperation between the base hospital and the registrar in the camp surgeon's office.

Correspondence with the camps has indicated the greater reliability of the figures from the epidemiologist. We have, therefore, accepted their figures in preference to the weekly telegraphic reports for influenza, pneumonia, and deaths from these two causes during the autumn season. We speak of this to foreshadow any question which may arise in comparing articles on disease conditions in the army which have appeared from time to time or may appear in the future. We have inserted the complete list of the figures which we are using which have been selected after careful examination of the two sources. We do not claim absolute accuracy even after the laborious task of deriving basic figures with which to work. We do feel, however, that by this method of selection we have eliminated most, if not all, of the large discrepancies; and what errors remain may be looked upon as of minor character and not sufficient to alter materially the conclusions drawn therefrom.

Discussion of the influenza epidemic will be found by itself under Sections IV, V and VI.

A. DEATHS, ALL CAUSES

During the summer season, Camp Dodge headed the list of large camps in deaths from all causes with an annual rate per 1000 of 17. This is lower than the highest rate for the previous winter when Pike registered 30.7. Next to Dodge stands Gordon with a death rate of 10.8, and from this point on the rates decline gradually until we come to Syracuse, whose death rate was but 1.9. The records for Syracuse, however, are for two weeks instead of for the twenty-two weeks of the summer season. McArthur likewise is represented only by about seventeen weeks. McClellan, third from the bottom of the table, covers the full record of twenty-two weeks. Its death rate was 2.3.

In Table 9 there are presented the camps in the order of their death rate together with the average strength for the season, number of deaths from disease, number of deaths from causes other than disease, the number of deaths from all causes, and the annual death rate per 1000 for all causes. The relative standing of the camps in mortality is shown graphically in Chart XVI. The most noticeable change on comparing this graph with the graph for the six winter

TABLE 9

DEATHS IN ARMY CAMPS

Five Summer Months—Week Ending April 5, 1918, to August 30, 1918

Annual Death Rate per 1000 for all Troops in U. S..... 5.7

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF DEATHS FROM DISEASE	NUMBER OF DEATHS FROM CAUSES OTHER THAN DISEASE	NUMBER OF DEATHS FROM ALL CAUSES	ANNUAL DEATH RATE PER 1000 (ALL CAUSES)
1	Dodge	31.2	207	18	225	17.0
2	Gordon	36.4	161	6	167	10.8
3	Pike	36.5	155	5	160	10.3
4	Funston	25.1	104	2	106	10.0
5	Las Casas*	12.8	18	0	18	9.5
6	Custer	26.5	83	12	95	8.5
7	Travis	31.2	94	9	103	7.8
8	Wheeler	23.8	70	7	77	7.6
9	Sherman	32.8	88	3	91	6.5
10	Taylor	34.7	85	4	89	6.1
11	Jackson	33.4	79	3	82	5.8
12	Bowie	19.1	29	18	47	5.8
13	Cody	24.5	55	4	59	5.7
14	Upton	34.5	74	10	84	5.7
15	Grant	36.4	77	5	82	5.3
16	Devens	36.1	71	6	77	5.0
17	Fremont	19.9	34	6	40	4.7
18	Shelby	20.5	28	9	37	4.3
19	Lewis	34.2	52	10	62	4.3
20	Kearny	19.4	20	15	35	4.3
21	Sheridan	15.9	23	4	27	4.0
22	Wadsworth	21.7	29	8	37	4.0
23	Meade	36.3	55	2	57	3.7
24	Lee	42.5	57	7	64	3.6
25	Sevier	19.5	28	2	30	3.6
26	Greene*	7.5	2	0	2	3.5
27	Beauregard	22.1	26	6	32	3.4
28	Greenleaf*	17.7	10	2	12	2.9
29	Johnston	17.6	16	5	21	2.8
30	Dix	46.1	43	10	53	2.7
31	Logan	15.1	13	3	16	2.5
32	Hancock	25.5	20	6	26	2.4
33	MacClellan	15.5	12	3	15	2.3
34	MacArthur*	18.5	11	1	12	2.0
35	Syracuse*	13.5	1	0	1	1.9

*Greenleaf—12 weeks—Week ending June 14 to Aug. 30.
*Las Casas—9 weeks—Week ending July 5 to Aug. 30.
*Greene—3 weeks—Week ending Aug. 16 to Aug. 30.
*Syracuse—2 weeks—Week ending Aug. 23 to Aug. 30.
*MacArthur—17 weeks—Week ending May 10 to Aug. 30.

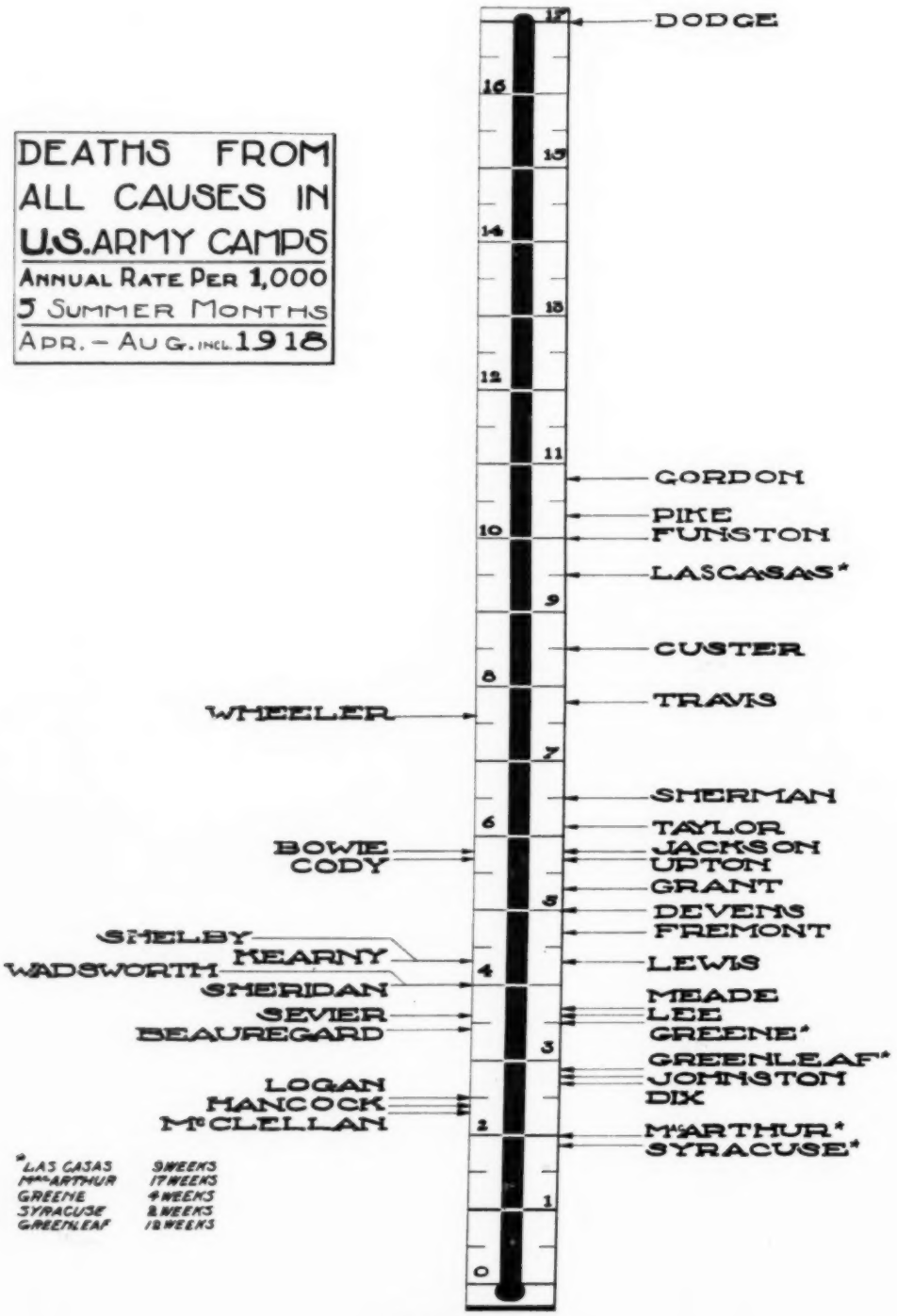
DEATHS FROM ALL CAUSES IN U.S. ARMY CAMPS
ANNUAL RATE PER 1,000
5 SUMMER MONTHS
APR. – AUG. INCL. 1918
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
DODGE
GORDON
PIKE
FUNSTON
LASCASAS*
CUSTER
TRAVIS
SHERMAN
TAYLOR
JACKSON
UPTON
GRANT
DEVENS
FREMONT
LEWIS
MEADE
LEE
GREENE*
GREENLEAF*
JOHNSTON
DIX
M'ARTHUR*
SYRACUSE*
WHEELER
BOWIE
CODY
SHELBY
KEARNY
WADSWORTH
SHERIDAN
SEVIER
BEAUREGARD
LOGAN
HANCOCK
McCLELLAN
*LAS CASAS 9 WEEKS
M'ARTHUR 17 WEEKS
GREENE 4 WEEKS
SYRACUSE 2 WEEKS
GREENLEAF 12 WEEKS

CHART XVI.

months published in the previous report by the authors, is to be found in the rise of some of the northern camps to the top of the table, notably, Dodge and Custer. Pike, Wheeler, Beauregard and Jackson, which were so high during the winter are lower in the summer table, Beauregard in particular having dropped from the winter position of third place to a summer standing of twenty-seventh. Dix, Logan, Hancock and McClellan retained their position at the bottom of the table throughout both seasons.

Bowie and Kearny are somewhat unique in that over 50 per cent of the deaths were due to causes other than disease. As a rule deaths from such causes represent but a very small proportion of all deaths.

A very different picture is found in the autumn season. (See Table 10 and Chart XVII.) This marked the period of the influenza epidemic which was responsible for the great mortality. Camp Cody stands at the top of the list with an annual death rate of 132. The average strength of Cody was slightly less than 6,000; the average strength for any week varying from 3,400 for the first week in September up to 11,100 for the third week in November. The strength then dwindled to 2,600 for the last week in December. Because of this fluctuation in the strength the significance of the death rate at Cody is not so great as it is at a camp whose strength is more constant. Syracuse has a record for thirteen weeks of 123. Sherman is the first of the camps with a strength around 30,000 to show a high death rate, namely, 114. Next to Sherman stands Beauregard with 102 and Grant with 97.8. From this point down through the table the figures decrease, gradually dropping as low as 13.1 for Las Casas. Lewis of the very large camps stands at the bottom of the table with a rate of 17.7. The strength of Camp Lewis was 35,000. This rate may be noted as almost identical with the rate for Dodge which stood first in the summer table.

Perhaps the most noticeable feature of this autumn death table is the relatively high position occupied by the northern camps which hitherto had most satisfactory records. Of the first ten camps not over three may be looked upon as southern camps and only one of the first ten was peopled by southern troops against whom during the previous fall the army's high death rate was charged. Jackson, Wheeler, Pike and Travis, which previously had high death rates, are all to be found in the lower half of the table. Of course it must be borne in mind that conditions have changed materially during the fifteen-month period about which we are writing. During that time alterations have taken place in the camp personnel, in the frequency of troop movements and in the purposes of the camp. Therefore, we must not be surprised at finding the camps changing in the morbidity and mortality tables from season to season.

Pneumonia has continued to be throughout the entire period the chief cause of death. In our report of the winter of 1917-18 we attributed the high death rate to the new recruit and especially to the new southern and new rural recruit. It was the nature of the camp personnel far more than the camp surroundings or camp management which determined sickness and death. With the experience of the past fall before us there is no reason to alter this judgment. Again the evidence points to the rural recruit as the camp's greatest liability.

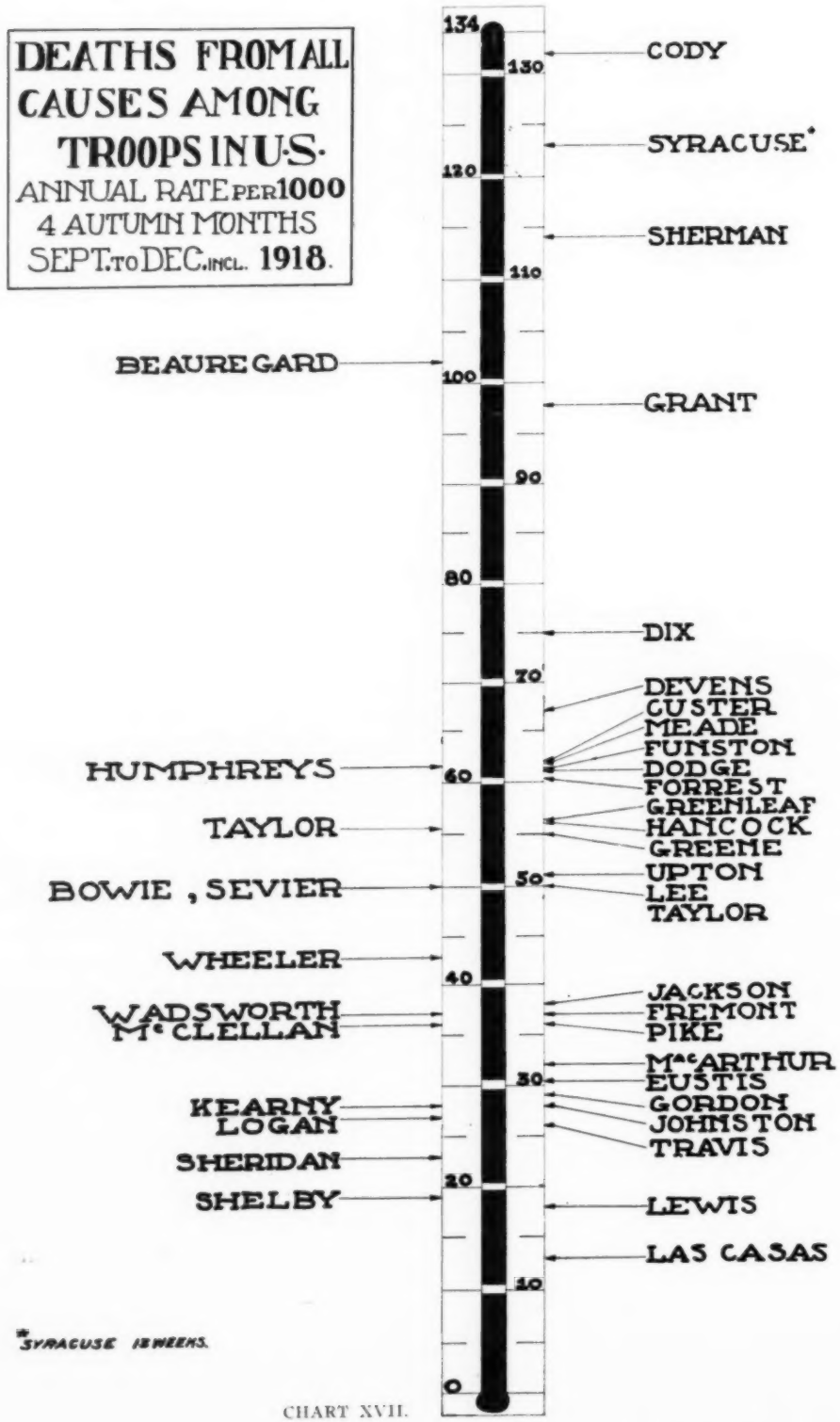
DEATHS FROM ALL CAUSES AMONG TROOPS IN U.S.
ANNUAL RATE PER 1000
4 AUTUMN MONTHS
SEPT. TO DEC. INCL. 1918.
134
130
120
110
100
90
80
70
60
50
40
30
20
10
0
CODY
SYRACUSE*
SHERMAN
BEAUREGARD
GRANT
DIX
DEVENS
CUSTER
MEADE
FUNSTON
DODGE
FORREST
GREENLEAF
HANCOCK
GREENE
UPTON
LEE
TAYLOR
HUMPHREYS
TAYLOR
BOWIE, SEVIER
WHEELER
WADSWORTH
Mc CLELLAN
JACKSON
FREMONT
PIKE
MacARTHUR
EUSTIS
GORDON
JOHNSTON
TRAVIS
KEARNY
LOGAN
SHERIDAN
SHELBY
LEWIS
LAS CASAS
*SYRACUSE 13 WEEKS.

CHART XVII.

TABLE 10

DEATHS IN ARMY CAMPS, FOUR AUTUMN MONTHS

Week Ending September 6, 1918, to December 27, 1918

Annual Death Rate per 1000 for All Troops in the U. S..... 48.5.

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF DEATHS FROM DISEASE	NUMBER OF DEATHS FROM CAUSES OTHER THAN DISEASE	NUMBER OF DEATHS FROM ALL CAUSES	ANNUAL DEATH RATE PER 1000 (ALL CAUSES)
1	Cody	5.9	257	1	258	132.
2	Syracuse*	7.4	225	3	228	123.
3	Sherman	30.9	1147	6	1153	114.
4	Beauregard	13.7	456	3	459	102.
5	Grant	35.0	1119	4	1123	97.8
6	Dix	35.0	858	0	858	75.0
7	Devens	39.5	855	10	865	67.0
8	Meade	42.1	843	8	851	61.9
9	Custer	36.1	692	4	696	61.7
10	Humphreys	24.1	481	3	484	61.5
11	Funston	49.0	976	6	982	61.3
12	Dodge	28.5	767	2	769	61.1
13	Forrest	9.2	180	1	181	60.3
14	Greenleaf	19.9	366	1	367	56.4
15	Hancock	34.0	610	15	625	56.2
16	Taylor	54.9	992	4	996	55.5
17	Greene	16.6	300	0	300	55.3
18	Upton	27.9	458	0	462	50.7
19	Sevier	23.3	378	6	384	50.4
20	Lee	43.8	703	10	713	49.8
21	Bowie	9.8	159	0	159	49.6
22	Wheeler	12.5	174	1	175	42.8
23	Jackson	38.2	465	6	471	37.7
24	Wadsworth	15.3	186	1	187	37.4
25	Fremont	12.9	154	1	155	36.8
26	McClellan	24.6	287	1	288	35.8
27	Pike	44.2	514	1	515	35.7
28	MacArthur	20.7	210	8	218	32.2
29	Eustis	14.0	145	1	146	30.4
30	Gordon	29.3	228	2	230	29.3
31	Johnston	19.7	179	1	180	27.9
32	Kearny	17.5	156	3	159	27.8
33	Logan	14.3	124	2	126	27.0
34	Travis	32.3	265	4	269	25.5
35	Sheridan	22.0	159	3	162	22.5
36	Shelby	12.1	73	2	75	18.9
37	Lewis	35.3	198	6	204	17.7
38	Las Casas	12.8	83	1	84	13.1

*Syracuse—13 weeks—Week ending Sept. 6, to Nov. 29.

We are handicapped in analyzing the disease situation in 1918. In the winter of 1917-18 we knew with considerable accuracy the source of the men at each camp. Since that time men have been shifted about to such an extent and the shifts have become so frequent that it is out of the question to look upon a camp in terms of the sources of the personnel. Our information about troop movements, draft arrivals, and transfers from camp to camp, is incomplete, and much of what we have is unreliable. If this information were available we should be in a much better position to analyze the causes of sickness.

Generally speaking it would seem as though the northern camps had a greater proportion of new men but the differences between northern and southern camps in this respect are by no means clear cut. We believe that the factor of climate and camp location exercises an influence in this latest period that was not evident from the analysis of the first winter season.

B. MEASLES

During the fifteen-month period to which we have repeatedly referred, measles has appeared in severe epidemic form only during the first winter season. There has been no repetition on a large scale of the experience of that time. In the first of the three

TABLE 11

MEASLES—FIVE SUMMER MONTHS

Week Ending April 5, 1918, to August 30, 1918

Annual Admission Rate per 1000 for All Troops in U. S....23.2

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000	NUMBER OF DEATHS
1	Pike	36.5	1306	84.0	4
2	Las Casas*	12.8	173	78.1	0
3	Greenleaf*	17.7	253	61.4	2
4	Taylor	34.7	894	60.8	0
5	Gordon	36.4	891	57.8	0
6	Dodge	31.2	750	56.1	0
7	Sevier	19.5	443	53.6	0
8	Jackson	33.4	696	49.3	1
9	Johnston	17.6	276	37.1	0
10	Lee	42.5	640	35.6	0
11	Sheridan	15.9	202	30.0	0
12	Shelby	20.5	221	25.5	0
13	Funston	25.1	251	23.1	0
14	Beauregard	22.1	213	22.7	0
15	Travis	31.2	259	19.1	0
16	Devens	36.1	304	19.1	1
17	Fremont	19.9	151	17.9	1
18	Grant	36.4	266	17.2	0
19	Kearny	19.4	132	16.2	0
20	Custer	26.5	182	16.2	0
21	Logan	15.1	102	16.1	0
22	Wadsworth	21.7	143	15.6	1
23	Upton	34.5	216	14.8	1
24	Cody	24.5	150	14.5	0
25	Lewis	34.2	195	13.5	0
26	MacArthur*	15.5	66	13.0	0
27	Sherman	32.8	170	12.2	5
28	Dix	46.1	237	12.0	0
29	Greene*	7.5	6	10.4	0
30	Meade	36.3	138	9.0	0
31	McClellan	18.5	63	8.1	0
32	Hancock	25.5	43	4.0	0
33	Bowie	19.1	30	3.7	0
34	Syracuse*	13.5	1	1.9	0

*Las Casas—9 weeks—Week ending July 5 to Aug. 30.
*Greenleaf—12 weeks—Week ending June 14, to Aug. 30.
*MacArthur—17 weeks—Week ending May 10, to Aug. 30.
*Syracuse—2 weeks—Week ending Aug. 23, to Aug. 30.
*Greene—3 weeks—Week ending Aug. 16, to Aug. 30.

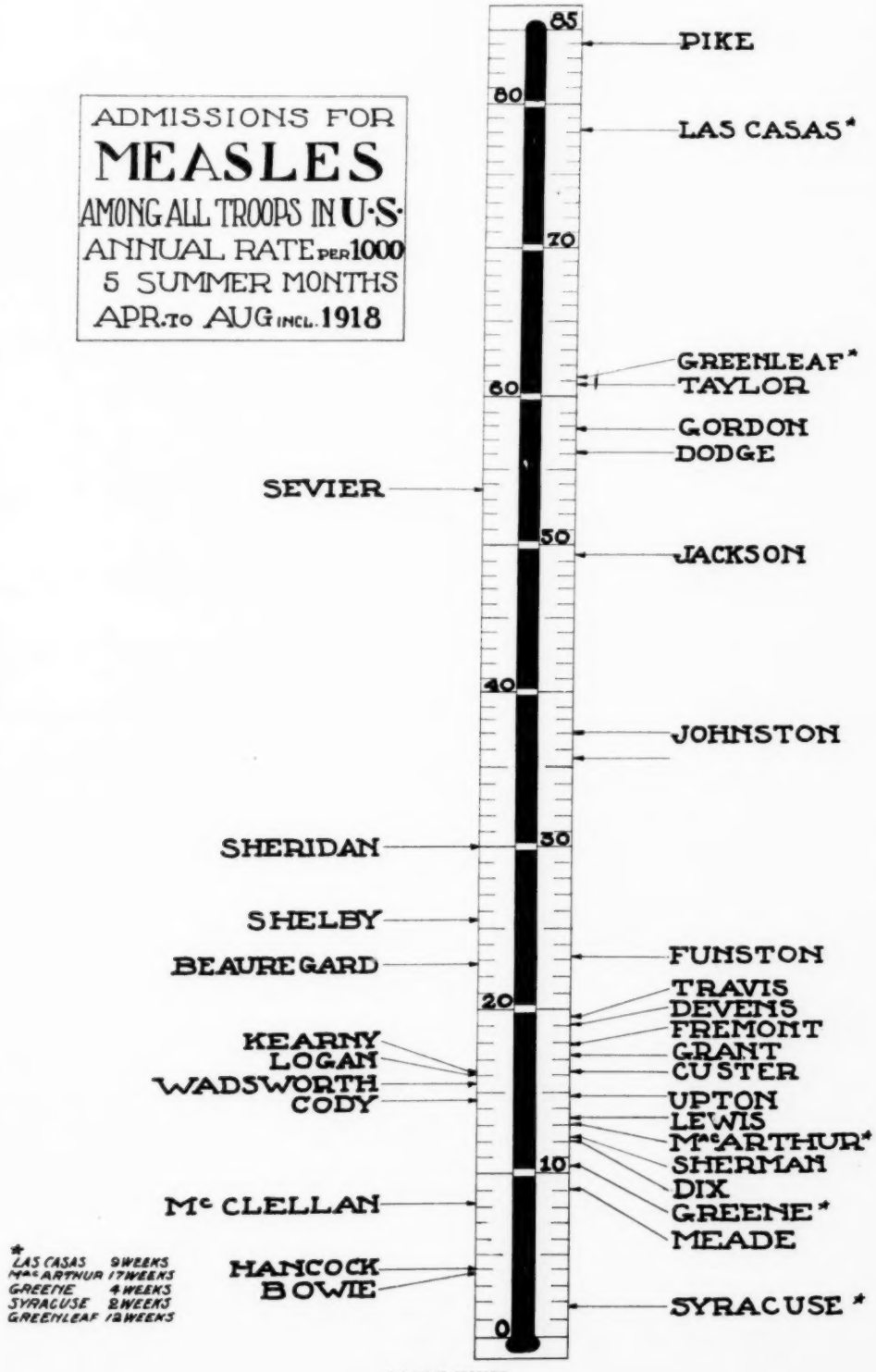
ADMISSIONS FOR
MEASLES
AMONG ALL TROOPS IN U·S·
ANNUAL RATE PER 1000
5 SUMMER MONTHS
APR. TO AUG INCL. 1918
85
80
70
60
50
40
30
20
10
0
PIKE
LAS CASAS*
GREENLEAF*
TAYLOR
GORDON
DODGE
SEVIER
JACKSON
JOHNSTON
SHERIDAN
SHELBY
BEAUREGARD
FUNSTON
TRAVIS
DEVENS
FREMONT
GRANT
CUSTER
KEARNY
LOGAN
WADSWORTH
CODY
UPTON
LEWIS
McARTHUR*
SHERMAN
DIX
GREENE*
MEADE
McCLELLAN
HANCOCK
BOWIE
SYRACUSE*
* LAS CASAS 9 WEEKS
McARTHUR 17 WEEKS
GREENE 4 WEEKS
SYRACUSE 8 WEEKS
GREENLEAF 12 WEEKS

CHART XVIII.

seasons, Pike had an annual admission rate for measles of 390 per 1000. During the summer season Pike still remained at the top of the list, but with a rate of 84. In the autumn season Las Casas stands first with a rate of 77.7 and Pike occupies fourth place with a rate of 64.8 (See Table 11 and Chart XVIII).

As has been pointed out elsewhere in this report, the most remarkable diminution of the measles incidence is to be found at Camp Wheeler, not a single case being reported for the entire season. Viewed in the light of Wheeler's record during the preceding winter when the measles morbidity rate was 297, Wheeler standing in third place among all the large camps, it is truly astounding that such an abrupt cutting off of measles incidence is possible. Measles, probably more than any other disease, runs true to form in picking the nonimmunes. A previous attack is apparently the only effective guarantee against measles in later life. Measles permeated Wheeler so effectively as to pick every susceptible person. When the epidemic was over there was no one left untouched. In the months to come there were practically no new increments entering Wheeler and consequently no fresh material introduced.

The experience at Wheeler is duplicated by a number of other camps where an epidemic raged during the fall of 1917. Bowie with a rate of 374 in the winter season dropped to a rate of 3.7 for the summer. Jackson with a rate of 230 fell off to 49.3, and Beauregard with a rate of 256 fell to 22.7. Las Casas is the only camp in the entire list which showed measles in epidemic form similar to the outbreaks that occurred in the fall of 1917. This was a newly formed camp of susceptible individuals.

There was a great deal of measles endemic at Camp Dodge due to the acquisition of new personnel, but the morbidity never reached the epidemic proportions of the previous winter. Of 525 cases occurring during the twelve weeks from June 1 to September 1, there is definite evidence that many men contracted the disease en route to camp. The cases during the summer were relatively mild, and an unusual feature was the high proportion of the hemorrhagic types.

Measles at Grant was sporadic and confined for the most part to recruits.

Devens reports that practically all measles during August was brought into camp by recruits. Major Woolley, epidemiologist, believes more intimate contact during the winter stimulates the spread of measles, whereas, during the summer with an equal number of foci and susceptibles the spread is slow.

The autumn season of 1918 differed from that of the previous year in that there were no camps that had recently been entirely filled from civilian life. It is this fact as much if not more than any other that accounts for the nonappearance of measles epidemics. (See Table 12 and Chart XIX.) Las Casas was the nearest likeness to a virgin camp as it had been in operation but a few weeks when measles appeared. Measles broke out in August and continued throughout September. If all of these cases had occurred within the autumn season the rate for Las Casas would have compared with some of the camps of the fall of 1917. As it was the epidemic at Las Casas was divided by the seasons, and the rates are consequently reduced in size. MacArthur, which stood next to Las Casas in measles incidence, can not be said to have had an epidemic, for the cases were spread out over the entire autumn season, on only one occasion exceeding 48 cases per week, this being in the second week of October, when 68 cases were reported. Shelby had a great deal of measles during August and September, and its incidence is reduced in consequence of our arbitrary division of the seasons. Measles has been endemic at Pike throughout the entire fifteen months. It assumed epidemic proportions only during the last week in October, 240 cases being reported in one week. At Funston, likewise, measles has been present almost continuously, the cases increasing appreciably during September. Bowie is the only camp in which measles did not appear during the autumn season.

The deaths attributed to measles have been few. In this respect, however, our report will differ from the Annual Report of the Surgeon General where measles cases which terminated fatally in pneumonia will be registered as deaths from measles. In the weekly reports it is customary to charge a measles-pneumonia death to pneumonia.

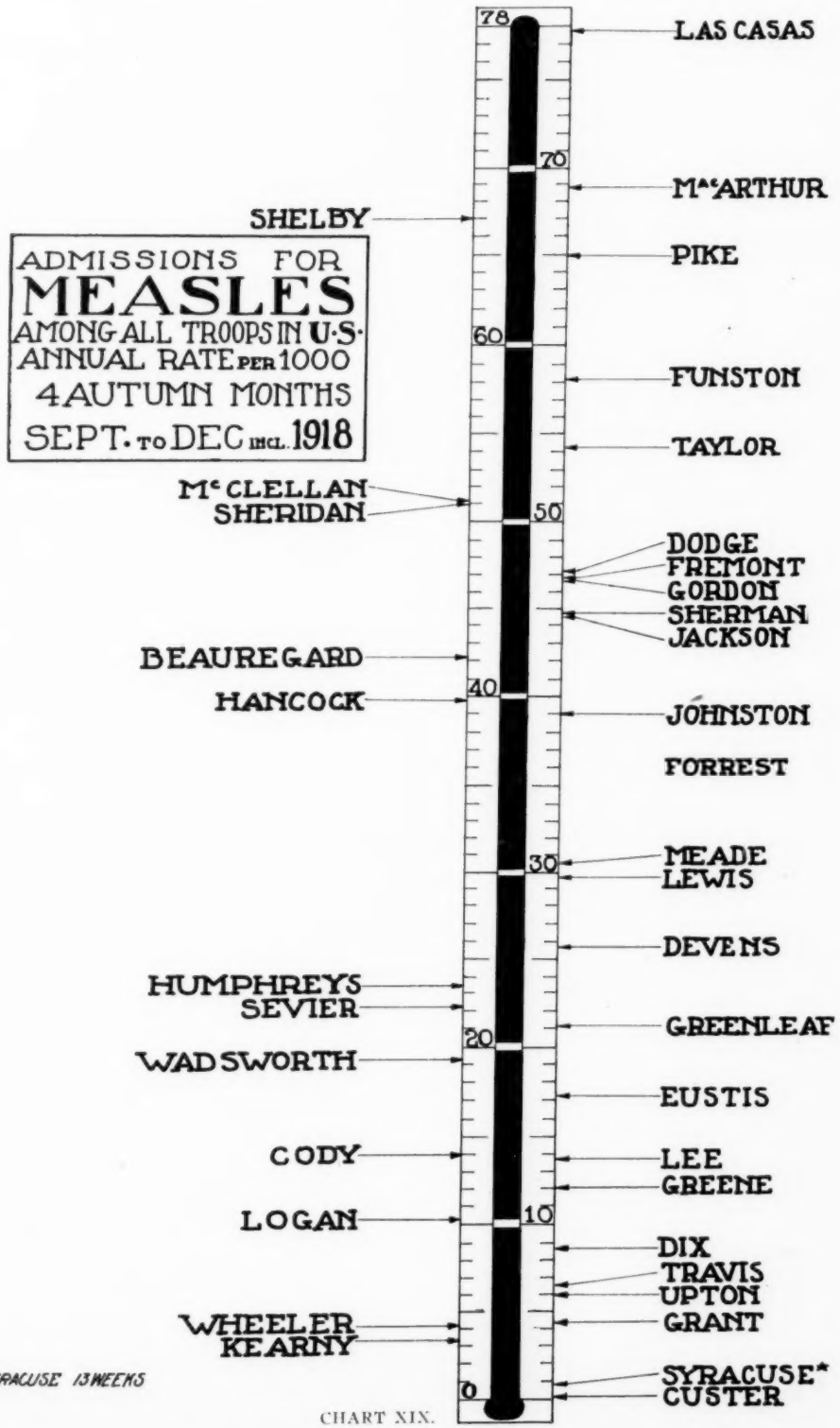
ADMISSIONS FOR
MEASLES
AMONG ALL TROOPS IN U·S·
ANNUAL RATE PER 1000
4 AUTUMN MONTHS
SEPT. TO DEC INCL. 1918
78
70
60
50
40
30
20
10
0
LAS CASAS
MacARTHUR
PIKE
FUNSTON
TAYLOR
DODGE
FREMONT
GORDON
SHERMAN
JACKSON
JOHNSTON
FORREST
MEADE
LEWIS
DEVENS
GREENLEAF
EUSTIS
LEE
GREENE
DIX
TRAVIS
UPTON
GRANT
SYRACUSE*
CUSTER
SHELBY
McCLELLAN
SHERIDAN
BEAUREGARD
HANCOCK
HUMPHREYS
SEVIER
WADSWORTH
CODY
LOGAN
WHEELER
KEARNY
*SYRACUSE 13 WEEKS

CHART XIX.

TABLE 12

MEASLES—FOUR AUTUMN MONTHS

Week Ending September 6, to December 27, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....24.1

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000	NUMBER OF DEATHS
1	Las Casas	12.8	325	77.7	0
2	MacArthur	20.7	465	68.7	1
3	Shelby	12.1	265	67.0	0
4	Pike	44.2	938	64.8	0
5	Funston	49.0	928	58.0	1
6	Taylor	54.9	973	54.2	1
7	McClellan	24.6	411	51.1	0
8	Sheridan	22.0	351	48.9	0
9	Dodge	28.5	438	47.1	1
10	Fremont	12.9	197	46.7	0
11	Gordon	29.3	446	46.6	2
12	Sherman	30.9	441	44.7	1
13	Jackson	38.2	556	44.5	1
14	Beauregard	13.7	190	42.4	0
15	Hancock	34.0	443	39.8	0
16	Johnston	19.7	251	39.0	0
17	Forrest	9.2	108	36.0	0
18	Meade	42.1	419	30.5	4
19	Lewis	35.3	343	29.7	1
20	Devens	39.5	330	25.6	0
21	Humphreys	24.1	185	23.5	1
22	Sevier	23.3	170	22.3	0
23	Greenleaf	19.9	138	21.2	2
24	Wadsworth	15.3	97	19.4	0
25	Eustis	14.0	79	17.2	0
26	Cody	5.9	27	14.0	0
27	Lee	43.8	196	13.7	0
28	Greene	16.6	65	12.0	0
29	Logan	14.3	48	10.3	0
30	Dix	35.0	101	8.8	0
31	Travis	32.3	70	6.6	1
32	Upton	27.9	56	6.1	0
33	Grant	35.0	49	4.3	0
34	Wheeler	12.5	17	4.2	0
35	Kearny	17.5	19	3.3	0
36	Syracuse*	7.4	2	.8	0
37	Custer	36.1	2	.2	0

*Syracuse—13 weeks—Week ending Sept. 6, to Nov. 29.

Much has been said of the importance of measles as a predisposing cause of pneumonia, particularly bronchopneumonia. Of 235 cases of measles at Cody during the winter of 1917-18, 77 or 33 per cent developed either bronchopneumonia or lobar pneumonia. Of these about 42 per cent died, which is a high pneumonia fatality.

As a rule pneumonia follows measles with far less frequency than is indicated at Cody. The Surgeon General's Report for 1918 gives 48,900 measles admissions and 2,075 pneumonias resulting therefrom. This indicates that 4.25 per cent of measles cases terminated in pneumonia. This figure seems so small as to indicate a lack of association between the two. Nevertheless this association exists. Among 510,100 men who did not have measles in 1918 there occurred 8,432 cases of pneumonia. The percentage pneumonia incidence is thus 1.65. We may interpret these percentages in the following manner:

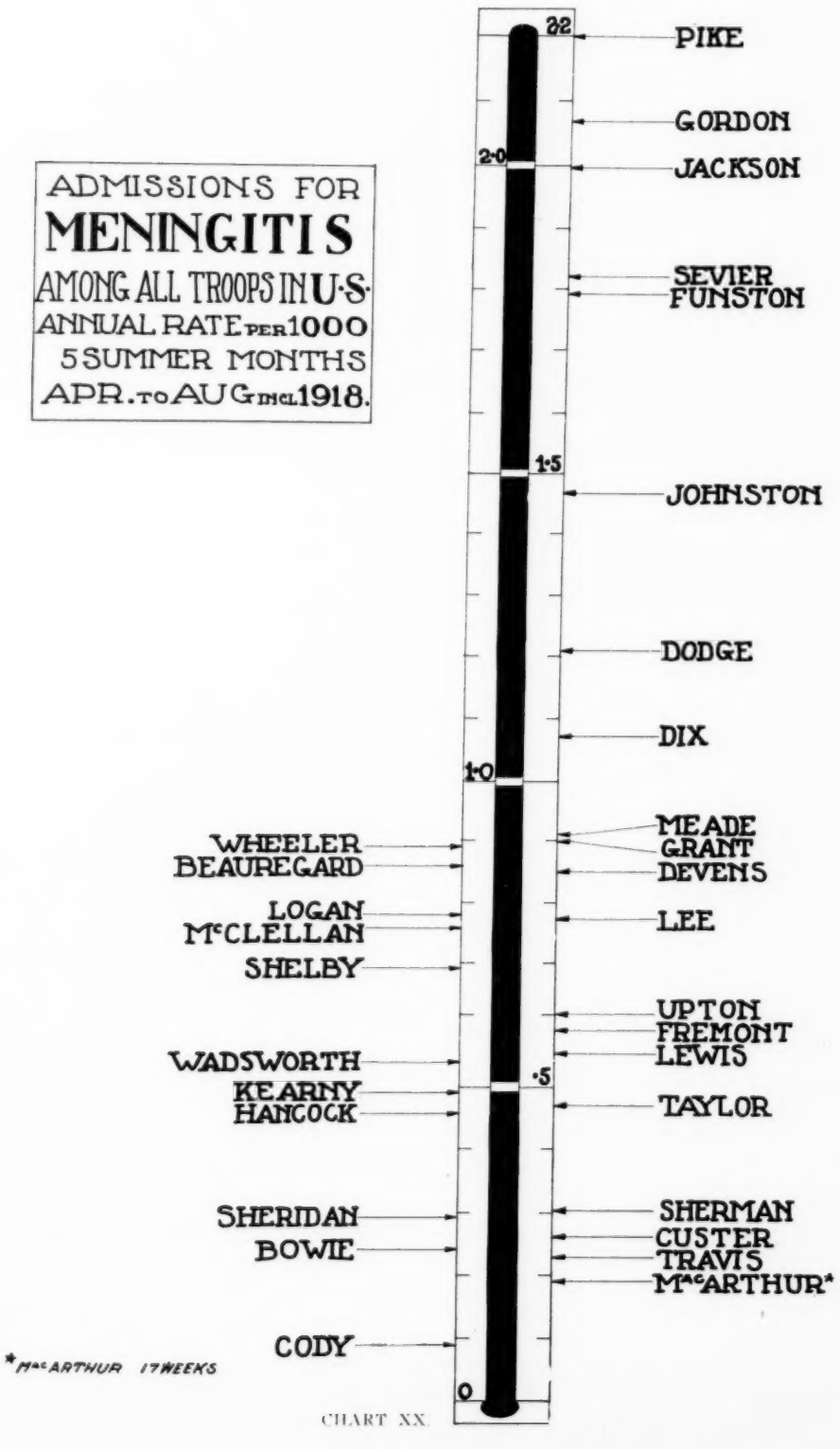
ADMISSIONS FOR
MENINGITIS
AMONG ALL TROOPS IN U·S·
ANNUAL RATE PER 1000
5 SUMMER MONTHS
APR. TO AUG INCL 1918.
2·2
2·0
1·5
1·0
·5
0
PIKE
GORDON
JACKSON
SEVIER
FUNSTON
JOHNSTON
DODGE
DIX
MEADE
GRANT
DEVENS
LEE
UPTON
FREMONT
LEWIS
TAYLOR
SHERMAN
CUSTER
TRAVIS
MacARTHUR*
WHEELER
BEAUREGARD
LOGAN
McCLELLAN
SHELBY
WADSWORTH
KEARNY
HANCOCK
SHERIDAN
BOWIE
CODY
*MacARTHUR 17 WEEKS

CHART XX

Where one man without measles has pneumonia, two to three (2.6) men with measles will have pneumonia.

Measles thus predisposes to pneumonia.

Granted that measles predisposes to pneumonia, we must next appreciate the seriousness of what this means. It is much more than the ratio of 1 to 2.6 indicates. It is not merely that where one nonmeasles case has pneumonia, from two to three measles cases have pneumonia. It is this: the nonmeasles case is more likely to recover from pneumonia once he has it than is the measles case. Thus of 2,075 pneumonia cases following measles, 888, or 42.7 per cent, died. Of 8,432 pneumonia cases not following measles, 949 or only 11.3 per cent died. Measles thus not only predisposes to pneumonia, it predisposes to *fatal pneumonia*.

We may express this relationship of measles and pneumonia as brought out in the 1917 Report, in the following illustrative manner:

OF EVERY 1000 MEN WITH MEASLES, 44 HAVE PNEUMONIA AND 19 DIE.
OF EVERY 1000 MEN WITHOUT MEASLES, 17 HAVE PNEUMONIA AND 2 DIE.
THUS A PERSON WITH MEASLES IS TEN TIMES AS LIKELY TO DIE AS A PERSON WITHOUT MEASLES.

C. MENINGITIS

Meningitis prevailed most extensively during the winter months December, January, and February, 1917-18. The weekly rates from April to December, 1918, have approached the previous winter rates in only two weeks, namely, in the last weeks of October, or just following the peak of the influenza epidemic.

During the summer period meningitis was reported from 31 of the 38 large camps, the admissions varying from 1 to 34 for the period. Camp Pike stands at the top of the list with an annual admission rate per thousand of 2.2. Pike is followed closely by Gordon, Sevier and Funston. The rates from this point in the table decrease gradually to 0. (See Table 13 and Chart XX.)

In Table 13 there are also given the number of deaths from meningitis in each camp. From the death and admission columns there has been computed the case mortality. In two instances, there are more deaths than cases. Where the deaths exceed the cases, it is evident that the cases were not reported. For two-thirds of this table the number of cases are so few that the computation of the case mortality is not significant. For the first ten camps we see that the case mortality runs from 0 to 79 per cent. Grant had a case mortality of 79 per cent, Dodge 63 per cent and Sevier 53 per cent. On the other hand, Johnston had 11 cases but no deaths, and Meade a case mortality of but 21 per cent. For the other camps the case mortality runs from 38 per cent to 53 per cent.

During the autumn months meningitis increased, Beauregard heading the table for the season with an admission rate of 4.9. (See Table 14 and Chart XXI.) At least seven camps had rates higher than the highest rate for the summer season. During the winter of 1917-18 meningitis was most prevalent at Camps Jackson, Beauregard, and Funston. During the summer season these three camps were within the first twelve in the table, and during the autumn season the same three camps were in the first thirteen of the table. For the other camps there is apparently no persistent rate as the standing of each camp fluctuates with the season. This table does not indicate any relation between influenza and meningitis. Of the first ten camps in the meningitis table, Beauregard, Devens and Meade stood high as respects influenza, but the other camps were not unusually high. This is contrary to the experience as shown in Chart XIV, where meningitis increases at the same time as influenza. A number of the camps speak of influenza increasing the meningitis incidence.

Taking the first nineteen camps in the autumn table, all of which have at least a dozen cases of meningitis, we find the case mortality varies from 6 per cent at Sherman to 55 per cent at Pike. At Funston where meningitis was more or less prevalent throughout the

TABLE 13

MENINGITIS—FIVE SUMMER MONTHS

Week Ending April 5, 1918, to August 30, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....0.83

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000	NUMBER OF DEATHS	PER CENT CASE MORTALITY
1	Pike	36.5	34	2.2	15	44.
2	Gordon	36.4	32	2.1	15	47.
3	Jackson	33.4	28	2.0	12	43.
4	Sevier	19.5	15	1.8	8	53.
5	Funston	25.1	19	1.8	9	47.
6	Johnston	17.6	11	1.5	0	0.
7	Dodge	31.2	16	1.2	10	63.
8	Dix	46.1	21	1.1	8	38.
9	Meade	36.3	14	.9	3	21.
10	Grant	36.4	14	.9	11	79.
11	Wheeler	23.8	9	.9	7	78.
12	Beauregard	22.1	8	.9	5	63.
13	Devens	36.1	13	.8	4	31.
14	Logan	15.1	5	.8	0	0.
15	Lee	42.5	14	.8	2	14.
16	McClellan	18.5	6	.8	2	33.
17	Shelby	20.5	6	.7	3	50.
18	Upton	34.5	9	.6	6	67.
19	Fremont	19.9	5	.6	1	20.
20	Lewis	34.2	8	.5	5	63.
21	Wadsworth	21.7	5	.5	5	100.
22	Kearny	19.4	4	.5	3	75.
23	Taylor	34.7	7	.5	4	57.
24	Hancock	25.5	5	.5	1	20.
25	Sherman	32.8	4	.3	4	100.
26	Sheridan	15.9	2	.3	0	0.
27	Custer	26.5	3	.3	5	100.+
28	Bowie	19.1	2	.2	1	50.
29	Travis	31.2	3	.2	3	100.
30	MacArthur*	15.5	1	.2	2	100.+
31	Cody	24.5	1	.1	1	100.

*MacArthur—17 weeks—Week ending May 10, to Aug. 30.

fifteen months, the case mortality was 50 per cent; at Jackson it was 31 per cent and at Beauregard, 18 per cent.

Meningitis is a disease apparently to which few people are susceptible. It has not occurred epidemically in the army. The cases are sporadic. Of 12 cases at Cody during 1917-18 not one was associated with any other.

Meningitis is kept alive by the existence of carriers, people who may or may not have had the disease. At Cody there were found among 20,000 men in the spring of 1918, 268 carriers. In no instance did these men give a previous history of meningitis and yet they were dangerous to their comrades for all of the active meningitis cases admitted close association with one or more of the carriers.

One hundred and thirty-two cases of meningitis occurred at Beauregard from September, 1917, to May, 1918. These were widely distributed over the camp and occurred quite independently of each other.

At Lewis, for the 15 months from October, 1917, to December, 1918, there were 54 cases of cerebrospinal meningitis. In the search for carriers 18,998 men were cultured, among whom were found 273 positives or 1.4 per cent. The ratio of carriers to cases is

TABLE 14

MENINGITIS—FOUR AUTUMN MONTHS

Week Ending September 6, 1918, to December 27, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....1.3

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000	NUMBER OF DEATHS	PER CENT CASE MORTALITY
1	Beauregard	13.7	22	4.9	4	18.
2	Taylor	54.9	81	4.5	20	25.
3	Sevier	23.3	31	4.1	9	29.
4	Jackson	38.2	49	3.9	15	31.
5	Greene	16.6	17	3.2	7	41.
6	Pike	44.2	38	2.6	21	55.
7	Devens	39.5	30	2.3	9	30.
8	McClellan	24.6	17	2.1	2	12.
9	Meade	42.1	27	1.9	12	44.
10	Logan	14.3	8	1.7	3	38.
11	Greenleaf	19.9	11	1.7	1	9.
12	Sherman	30.9	16	1.6	2	6.
13	Funston	49.0	24	1.5	12	50.
14	Gordon	29.3	15	1.5	7	47.
15	Humphreys	24.1	12	1.5	4	33.
16	Lee	43.8	18	1.2	7	39.
17	Lewis	35.3	14	1.2	4	29.
18	Dix	35.0	14	1.2	5	36.
19	Travis	32.3	12	1.1	2	17.
20	Cody	5.9	2	1.0	2	100.
21	Johnston	19.7	6	.9	2	33.
22	Hancock	34.0	10	.9	4	40.
23	Bowie	9.8	3	.9	2	67.
24	Wadsworth	15.3	4	.8	0	0.
25	MacArthur	20.7	4	.6	2	50.
26	Dodge	28.5	6	.6	2	33.
27	Fremont	12.9	2	.5	0	0.
28	Shelby	12.1	2	.5	1	50.
29	Wheeler	12.5	2	.5	2	100.
30	Upton	27.9	5	.5	2	40.
31	Custer	36.1	5	.4	3	60.
32	Grant	35.0	3	.3	2	67.
33	Sheridan	22.0	2	.3	1	50.
34	Eustis	14.0	1	.2	0	0.

five to one. Strange to say, no clinical cases developed among carriers and of 29 clinical cases cultured, but 7 showed the meningococcus in nasopharyngeal swabs. It was the general opinion that the cases fell off as the cultural method of control followed by isolation of carriers was put into effect. Again we are struck by the nonepidemic nature of the disease from the fact that with three exceptions no secondary cases developed within an organization.

Six cases of meningitis occurred at Devens during May and June. A brief description of these cases will be of interest in showing the absence of contact infection between them.

May 5.—Pvt. A, 3 Bn. Depot Brigade; just entered service; admitted to hospital for mumps four days after being drafted; no possibility of contact with meningitis in camp.

May 25.—Pvt. B, Medical Detachment, Base Hospital; three weeks in service; member of Co. 1, 1st. Bn., Depot Brigade, which was in quarantine; became sick about four

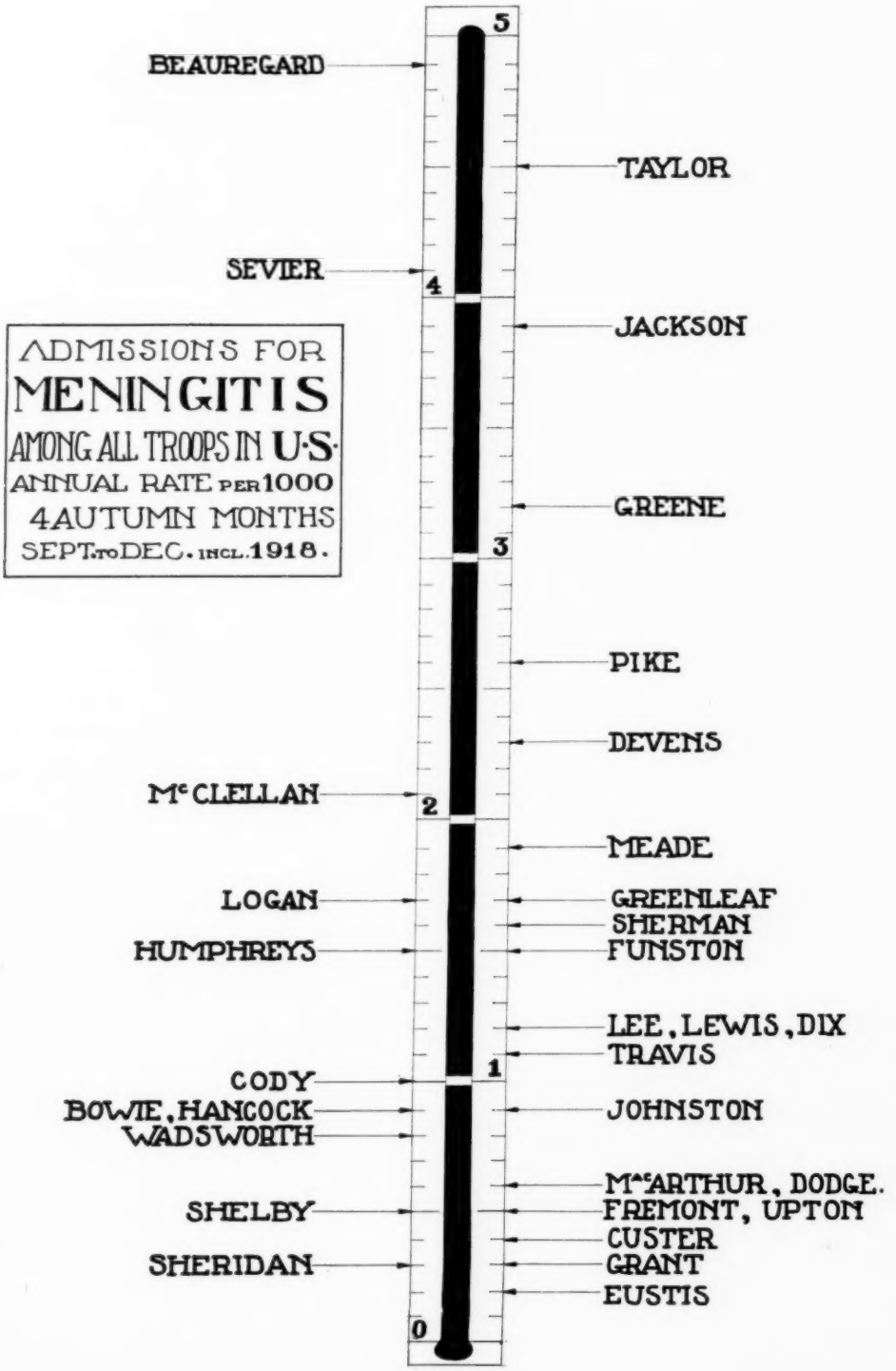
ADMISSIONS FOR
MENINGITIS
AMONG ALL TROOPS IN U.S.
ANNUAL RATE PER 1000
4 AUTUMN MONTHS
SEPT. TO DEC. INCL. 1918.
5
4
3
2
1
0
BEAUREGARD
TAYLOR
SEVIER
JACKSON
GREENE
PIKE
DEVENS
McCLELLAN
MEADE
LOGAN
GREENLEAF
SHERMAN
HUMPHREYS
FUNSTON
LEE, LEWIS, DIX
TRAVIS
CODY
BOWIE, HANCOCK
WADSWORTH
JOHNSTON
McARTHUR, DODGE.
SHELBY
FREMONT, UPTON
CUSTER
SHERIDAN
GRANT
EUSTIS

CHART XXI.

days after quarantine at which time he was with Medical Detachment at Base Hospital; no apparent opportunity for contact with meningitis.

June 1.—Pvt. C, (colored), Co. 3, 519 E. S. Bn., in hospital May 14-24 with mumps; no opportunity for contact with meningitis in hospital or quarters.

June 4.—Pvt. D, (colored), D. Co., 519 E. S. Bn.; two months' service; no other cases in his company and Pvt. C. (above) though a member of the same battalion lived in the second barracks distant.

June 4.—Lt. E., Co. D., 302 Inf.; 10 months' service; low sick rate in his company; in Boston on leave May 25; at rifle range about this time and also June 1.

June 4.—Lt. F., Hdq. Co., 303 Inf.; eight months' service; quartered with four other men in small building near stables for three weeks before taking ill; roommates well; on leave to Boston a week before illness.

There was no intimacy between any of these men. The most that can be said is that the majority of these and previous cases have appeared in the Depot Brigade and Service Battalions. There is more overcrowding in these units than elsewhere in camp.

It is evident from this Devens incident that few people are susceptible to meningitis. There were one or more carriers in camp, who spread infection only as they came in contact with susceptible individuals. The victim did not need to be a roommate, a

TABLE 15

SCARLET FEVER—FIVE SUMMER MONTHS

Week Ending April 5, 1918, to August 30, 1918

Annual Admission Rate per 1000 for All Troops in U. S..... 3.4

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000	NUMBER OF DEATHS
1	Lewis	34.2	170	11.7	0
2	Dodge	31.2	138	10.4	0
3	Sherman	32.8	112	8.1	1
4	Custer	26.5	74	6.6	0
5	Logan	15.1	38	6.0	2
6	Dix	46.1	105	5.2	0
7	Kearny	19.4	39	4.8	0
8	Funston	25.1	40	3.8	0
9	Grant	36.4	58	3.8	0
10	Upton	34.5	51	3.5	0
11	Sheridan	15.9	15	2.2	0
12	Greenleaf*	17.7	8	1.9	0
13	Devens	36.1	29	1.9	0
14	Johnston	17.6	13	1.8	0
15	Pike	36.5	25	1.6	0
16	Sevier	19.5	13	1.6	0
17	Fremont	19.9	9	1.1	0
18	MacArthur*	15.5	5	1.0	0
19	Wadsworth	21.7	9	1.0	0
20	Gordon	36.4	15	1.0	0
21	Meade	36.3	14	.9	0
22	Taylor	34.7	13	.9	0
23	Travis	31.2	8	.6	0
24	Shelby	20.5	4	.5	1
25	Hancock	25.5	5	.5	0
26	Jackson	33.4	4	.3	0
27	Cody	24.5	3	.3	0
28	Lee	42.5	1	.05	0

*Greenleaf—12 weeks—Week ending June 14, to Aug. 30.
*MacArthur—17 weeks—Week ending May 10, to Aug. 30.

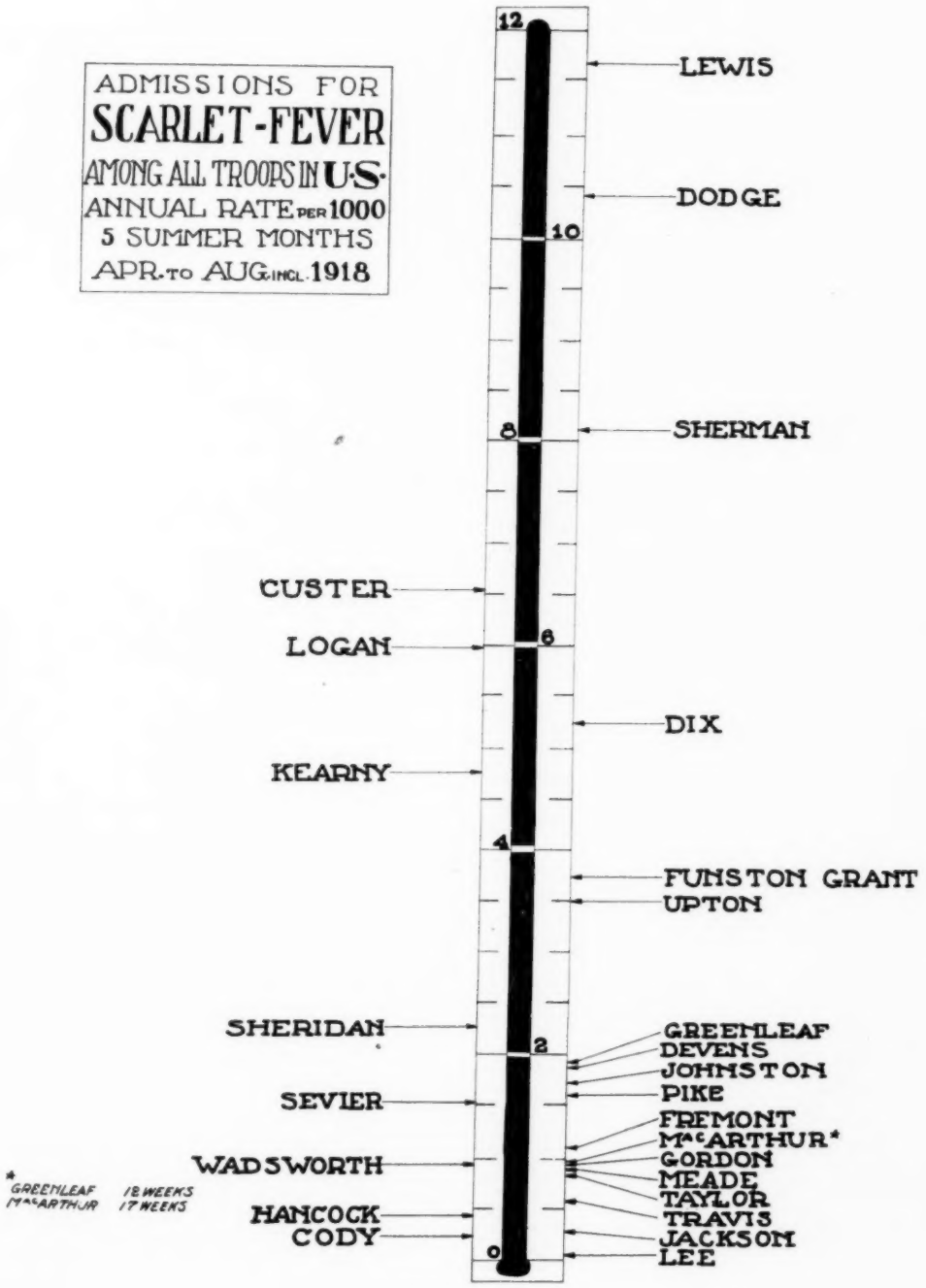
ADMISSIONS FOR
SCARLET-FEVER
AMONG ALL TROOPS IN U.S.
ANNUAL RATE PER 1000
5 SUMMER MONTHS
APR. TO AUG. INCL. 1918
12
10
8
6
4
2
0
LEWIS
DODGE
SHERMAN
CUSTER
LOGAN
DIX
KEARNY
FUNSTON GRANT
UPTON
SHERIDAN
SEVIER
WADSWORTH
HANCOCK
CODY
GREENLEAF
DEVENS
JOHNSTON
PIKE
FREMONT
Mac ARTHUR*
GORDON
MEADE
TAYLOR
TRAVIS
JACKSON
LEE
* GREENLEAF 18 WEEKS
Mac ARTHUR 17 WEEKS

CHART XXII.

messmate, or a member of the same company. Contact among soldiers is not limited to the four walls of a tent. This point should be borne in mind by those who advocate elaborate precautions in segregating men in their quarters. After all it is the infected hand and the careless mouth which are responsible for the trouble and these members can operate on the street, in the post exchange, at drill and at play. Until the simple rules of personal hygiene are taken seriously, other preventive activities may be considered woefully inadequate.

D. SCARLET FEVER

Scarlet fever during the winter months of 1917-18 was most prevalent at Camp Pike whose rate at this time was almost twice that of any other camp. The morbidity rates from Lewis, Kearny, Dodge, and Sherman were all above 12 per 1000. The highest rate for the summer season was 11.7 at Camp Lewis. Twenty-eight camps out of thirty-eight reported scarlet fever during the summer season. The scarlet fever data are presented in Table 15, and are illustrated in Chart XXII.

In the autumn of 1918 the only marked increase in scarlet fever was at Camps Han-

TABLE 16

SCARLET FEVER—FOUR AUTUMN MONTHS

Week Ending September 6, 1918, to December 27, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....2.2

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000	NUMBER OF DEATHS
1	Hancock	38.0	416	36.7	0
2	Cody	5.9	48	24.8	0
3	Funston	49.0	102	6.1	0
4	Taylor	54.9	65	3.6	0
5	Grant	35.0	31	2.7	2
6	Dodge	28.5	26	2.6	0
7	Lewis	35.3	24	2.1	0
8	Custer	36.1	17	1.4	0
9	Sherman	30.9	11	1.1	0
10	Sevier	23.3	8	1.0	1
11	Eustis	14.0	4	.9	0
12	Pike	44.2	13	.9	0
13	Wadsworth	15.3	4	.8	0
14	Syracuse*	7.4	1	.4	0
15	Greenleaf	19.9	4	.6	0
16	Meade	42.1	8	.6	1
17	Devens	39.5	7	.5	0
18	Jackson	38.2	5	.4	0
19	Sheridan	22.0	3	.4	0
20	Lee	43.8	4	.3	0
21	Johnston	19.7	2	.3	0
22	Gordon	29.3	3	.3	0
23	Dix	25.0	4	.3	0
24	MacArthur	20.7	2	.3	0
25	Kearny	17.5	2	.3	0
26	Upton	27.9	2	.2	0
27	Travis	32.3	1	.2	1
28	Shelby	12.1	1	.2	0
29	McClellan	24.6	2	.2	0
30	Logan	14.3	1	.2	0
31	Greene	16.6	1	.2	0

*Syracuse—13 weeks—Week ending Sept. 6, to Nov. 29.

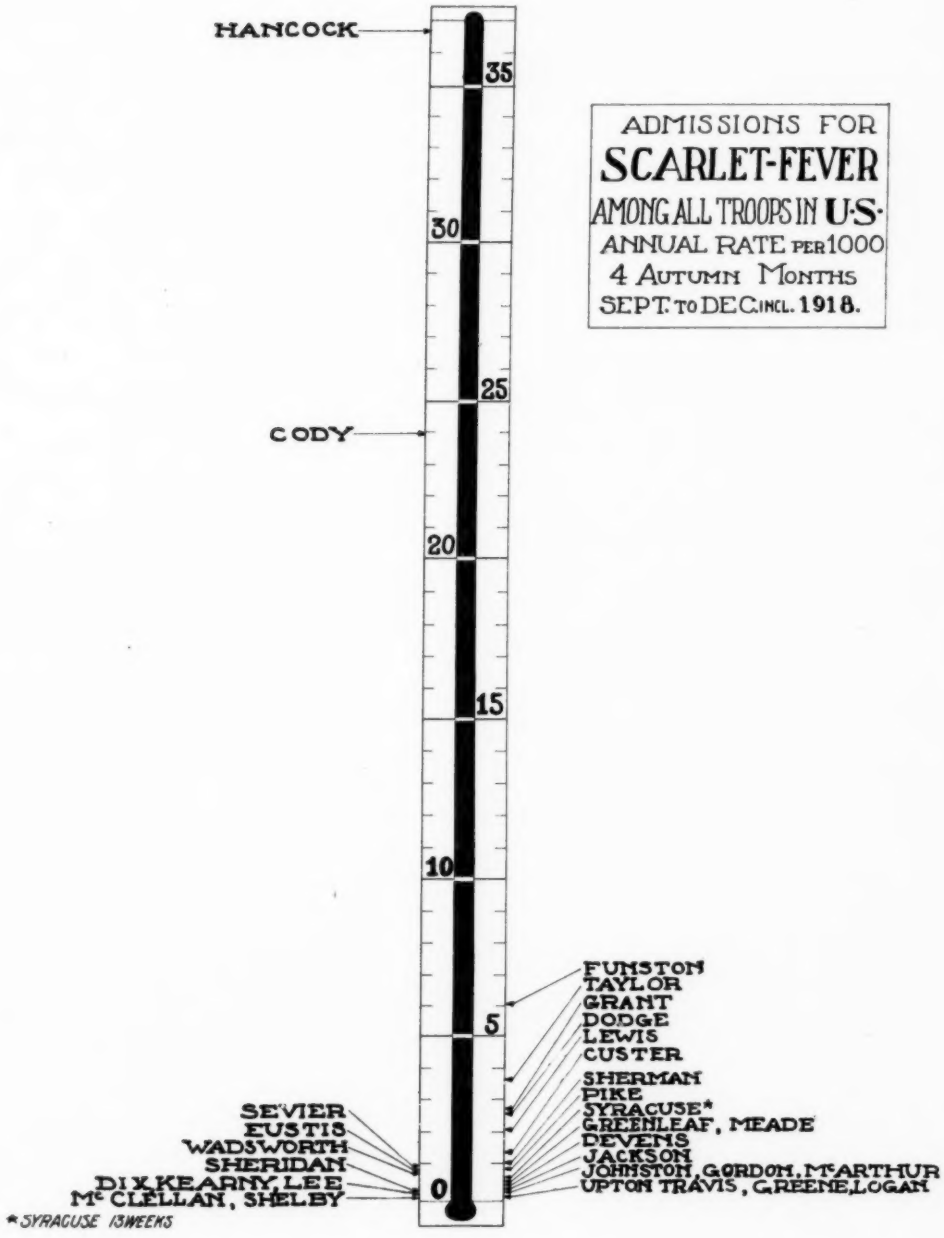
HANCOCK
CODY
35
30
25
20
15
10
5
0
ADMISSIONS FOR
SCARLET-FEVER
AMONG ALL TROOPS IN U·S·
ANNUAL RATE PER 1000
4 AUTUMN MONTHS
SEPT. TO DEC. INCL. 1918.
FUNSTON
TAYLOR
GRANT
DODGE
LEWIS
CUSTER
SHERMAN
PIKE
SYRACUSE*
GREENLEAF, MEADE
DEVENS
JACKSON
JOHNSTON, GORDON, McARTHUR
UPTON TRAVIS, GREENE, LOGAN
SEVIER
EUSTIS
WADSWORTH
SHERIDAN
DIX, KEARNY, LEE
McCLELLAN, SHELBY
*SYRACUSE 13 WEEKS

CHART XXIII.

cock and Cody, the former experiencing a rather severe epidemic in November. For the entire season there were 416 admissions for scarlet fever, but not a single death is reported from this cause. Of this total 212 occurred during the week ending November 15. Camp Cody had 48 admissions and stands second in the table with a rate of 24.8. The data for the autumn months are shown in Table 16, and illustrated in Chart XXIII. Cody's cases likewise occurred in the months of November and December. Thirty-one of the thirty-eight large camps had scarlet fever during the autumn season.

In commenting on the winter of 1917-18 it was stated that scarlet fever prevailed mostly in those camps which contained troops from the middle and far West. At this time the six camps with the highest rates were Pike, Lewis, Kearny, Sherman, Dodge and Grant. The same camps continued to have a relatively high scarlet fever rate, or at least higher than other camps, during the summer and during the fall. In the summer these camps were within the first fifteen in the table, Lewis, Dodge and Sherman standing at the top. In the autumn five of these camps are in the first twelve of the table, the

TABLE 17

MALARIA—FIVE SUMMER MONTHS

Week Ending April 5, 1918, to August 30, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....4.1

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000
1	Beauregard	22.1	377	40.4
2	Shelby	20.5	214	24.6
3	Pike	36.5	363	23.5
4	Sevier	19.5	106	12.8
5	Travis	31.2	126	9.5
6	Johnston	17.6	69	9.3
7	Logan	15.1	56	8.8
8	Las Casas*	12.8	15	6.8
9	Greenleaf*	17.7	27	6.6
10	Sheridan	15.9	41	6.1
11	Gordon	36.4	84	5.5
12	Bowie	19.1	39	4.8
13	McClellan	18.5	36	4.6
14	Hancock	25.5	42	3.9
15	MacArthur*	13.5	18	3.6
16	Jackson	33.4	50	3.5
17	Wadsworth	21.7	28	3.5
18	Dix	46.1	57	2.9
19	Wheeler	23.8	28	2.8
20	Meade	36.3	38	2.5
21	Kearny	19.4	17	2.1
22	Fremont	19.9	16	1.9
23	Lee	42.5	25	1.4
24	Dodge	31.2	18	1.4
25	Lewis	34.2	19	1.3
26	Sherman	32.8	18	1.3
27	Grant	36.4	17	1.1
28	Devens	36.1	14	.9
29	Cody	24.5	6	.6
30	Upton	34.5	8	.5
31	Custer	26.5	6	.5
32	Funston	25.1	5	.5

*Las Casas—9 weeks—Week ending July 5, to Aug. 30.
*Greenleaf—12 weeks—Week ending June 14, to Aug. 30.
*MacArthur—17 weeks—Week ending May 10, to Aug. 30.

sixth, Kearny, dropping to twenty-fifth. The southern and eastern men were for the most part largely free from scarlet fever during the first winter season, and continued so for the rest of the year, the exception being Camp Hancock. That scarlet fever in the civil community, which furnishes men to the camp, is responsible for the continuation of the disease in the camp, is borne out by the continued prevalence of the disease in the middle west and far western camps. In addition to the six we have mentioned as having high rates during the winter, we may add Custer, Logan and Funston, which were in the first eight of the table in the summer months, Custer and Funston being likewise in the first eight of the autumn table. In the latter period, Logan had but one case.

The deaths from scarlet fever have been few, but four being reported in all the large camps during the summer, and but five during the autumn.

TABLE 18

MALARIA—FOUR AUTUMN MONTHS

Week Ending September 6, 1918, to December 27, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....2.7

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000
1	Beauregard	13.7	192	42.8
2	Las Casas	12.8	131	31.3
3	Wheeler	12.5	66	16.1
4	Sevier	23.3	92	12.1
5	Eustis	14.0	49	10.7
6	Logan	14.3	43	9.0
7	Shelby	12.1	33	8.2
8	Johnston	19.7	53	8.1
9	Gordon	29.3	73	7.5
10	Bowie	9.8	19	5.8
11	Pike	44.2	58	3.9
12	McClellan	24.6	31	3.8
13	Jackson	38.2	29	2.3
14	Kearny	17.5	11	1.9
15	Travis	32.3	18	1.7
16	Wadsworth	15.3	8	1.6
17	MacArthur	20.7	9	1.3
18	Lewis	35.3	15	1.3
19	Humphreys	24.1	10	1.2
20	Greenleaf	19.9	7	1.1
21	Hancock	34.0	13	1.1
22	Funston	49.0	14	.9
23	Dodge	28.5	6	.6
24	Cody	5.9	1	.5
25	Sheridan	22.0	4	.5
26	Sherman	30.9	4	.4
27	Meade	42.1	5	.4
28	Lee	43.8	6	.4
29	Grant	35.0	5	.4
30	Dix	35.0	4	.3
31	Devens	39.5	4	.3
32	Greene	16.6	1	.2
33	Fremont	12.9	1	.2

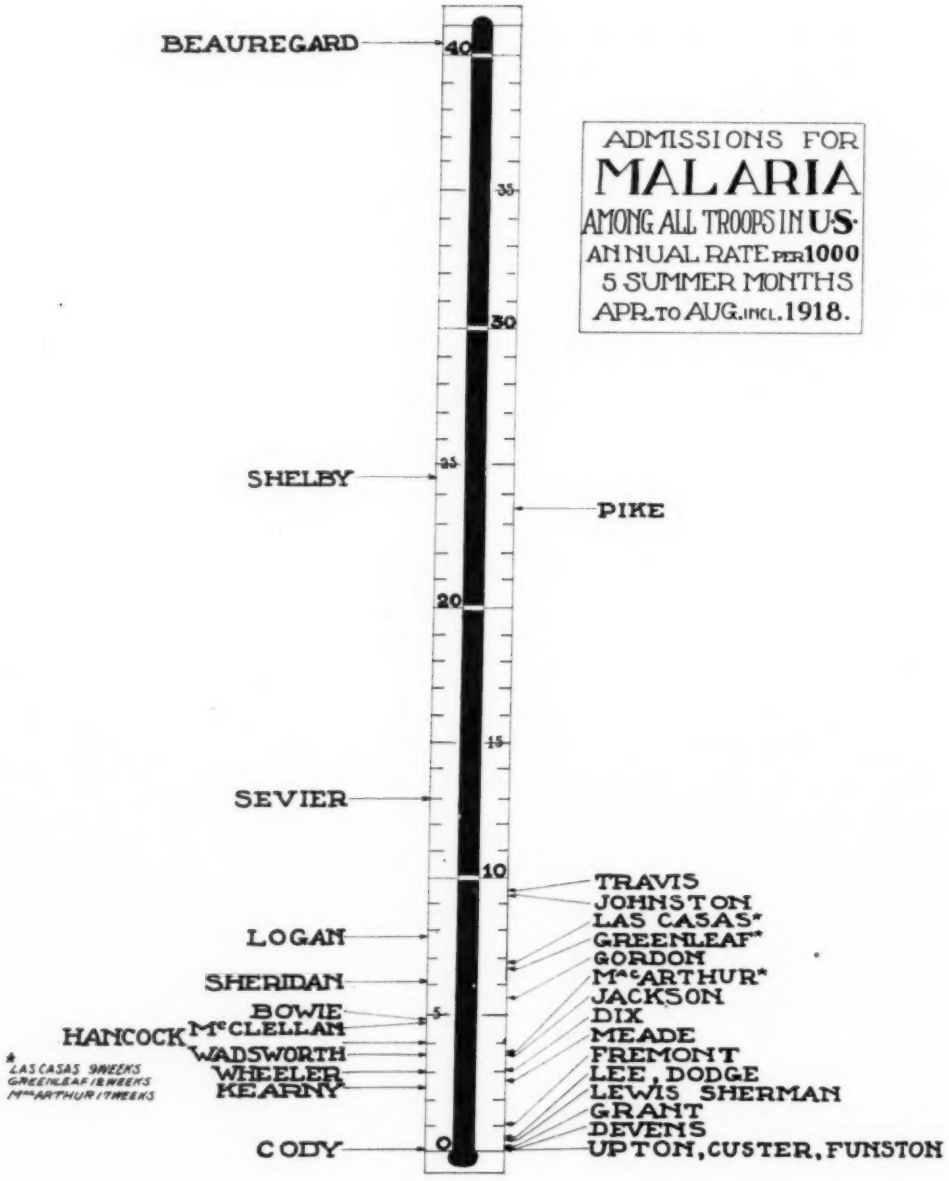
ADMISSIONS FOR
MALARIA
AMONG ALL TROOPS IN U.S.
ANNUAL RATE PER 1000
5 SUMMER MONTHS
APR. TO AUG. INCL. 1918.
BEAUREGARD
SHELBY
PIKE
SEVIER
LOGAN
SHERIDAN
BOWIE
HANCOCK
McCLELLAN
WADSWORTH
WHEELER
KEARNY
CODY
TRAVIS
JOHNSTON
LAS CASAS*
GREENLEAF*
GORDON
McARTHUR*
JACKSON
DIX
MEADE
FREMONT
LEE, DODGE
LEWIS SHERMAN
GRANT
DEVENS
UPTON, CUSTER, FUNSTON
40
35
30
25
20
15
10
5
0
* LAS CASAS 9 WEEKS
GREENLEAF 18 WEEKS
McARTHUR 17 WEEKS

CHART XXIV.

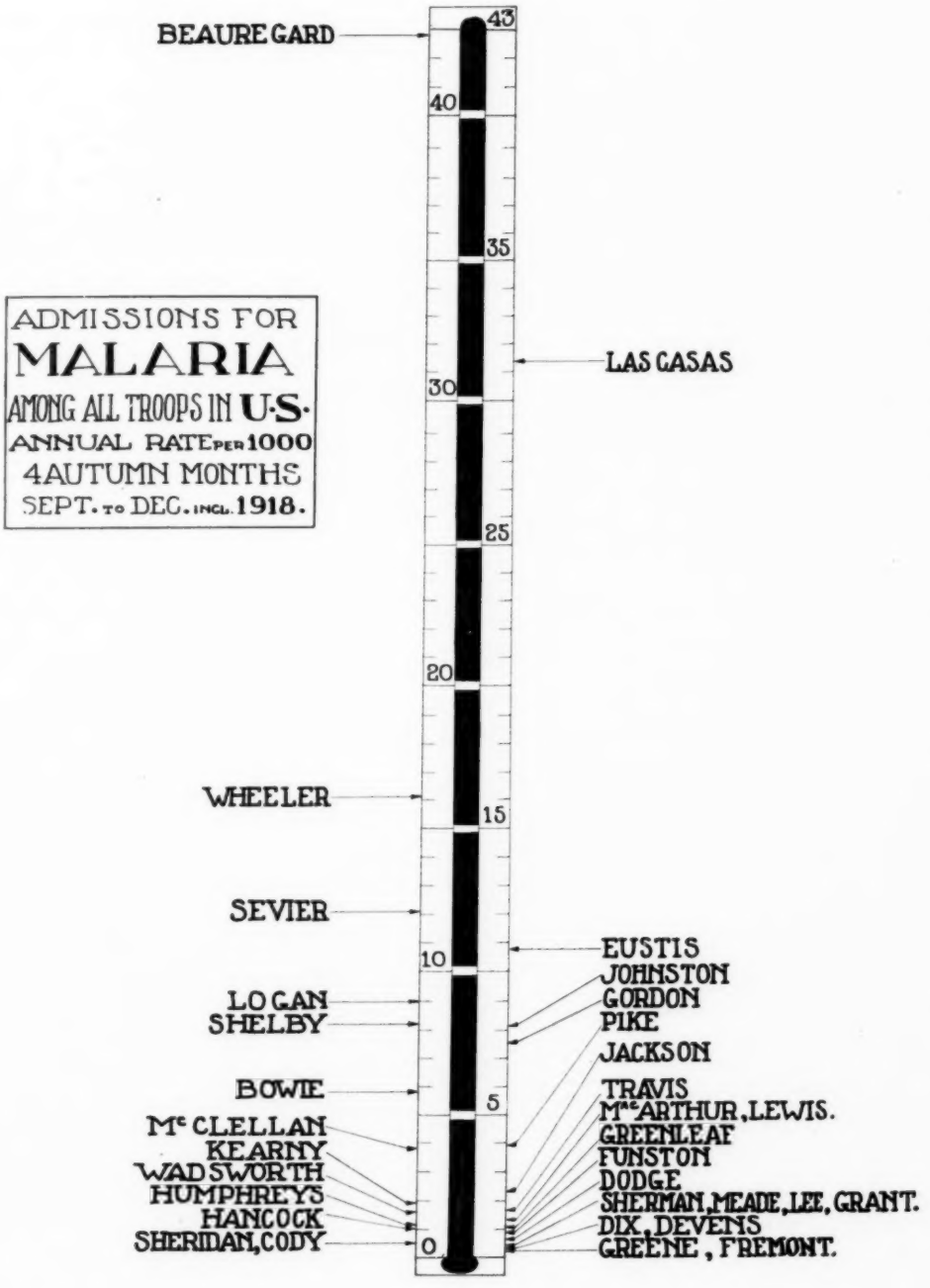
ADMISSIONS FOR
MALARIA
AMONG ALL TROOPS IN U.S.
ANNUAL RATE PER 1000
4 AUTUMN MONTHS
SEPT. TO DEC. INCL. 1918.
43
40
35
30
25
20
15
10
5
0
BEAUREGARD
LAS CASAS
WHEELER
SEVIER
LOGAN
SHELBY
BOWIE
Mc CLELLAN
KEARNY
WADSWORTH
HUMPHREYS
HANCOCK
SHERIDAN, CODY
EUSTIS
JOHNSTON
GORDON
PIKE
JACKSON
TRAVIS
MacARTHUR, LEWIS.
GREENLEAF
FUNSTON
DODGE
SHERMAN, MEADE, LEE, GRANT.
DIX, DEVENS
GREENE, FREMONT.

CHART XXV.

E. MALARIA

Malaria was most prevalent during the summer of 1918, the camps of southern men showing the greatest amount. Malaria data are given in Table 17, and illustrated in Chart XXIV. Beauregard stands at the top of the list with an annual admission rate of 40.4. This is followed by Shelby with a rate of 24.6, and Pike with 23.5. The remaining twenty-nine camps have rates varying from 12.8 to 5.8.

As seen in Table 18, the data of which are illustrated in Chart XXV, malaria during the autumn was likewise greatest at Beauregard whose rate was slightly greater than during the summer. The five camps with rates above ten are, in addition to Beauregard, Las Casas with a rate of 31.3, Wheeler with 16.1, Sherman, 12.1 and Eustis, 10.7. It is again the camps of southern troops where malaria is most prevalent.

The eradication of malaria is primarily a matter of sanitation, that of wiping out the breeding places of the malarial mosquito, but, the presence of malaria in army camps is not a criterion of the way this mosquito elimination work has been carried out. The malaria reports have come from men who contracted malaria prior to their entrance into the army. There is little if any evidence that malaria has spread among uninfected individuals in the camps.

Of 9 cases of malaria at Fremont from June 1 to August 31, all gave a history of previous attack before arrival at camp.

Devens reports that with one exception during the summer of 1918, all of the few cases of malaria were men from the southern states who brought the disease with them.

Sevier informs us that "no cases of malaria have developed—except in men coming from places where malaria is present." This refers to the summer months of June, July and August.

From Meade we learn that "of the 24 discovered cases of malaria in July (both latent and febrile cases) all occurred in recent arrivals and were plainly recurrences of old infections."

TABLE 19

TUBERCULOSIS—FIVE SUMMER MONTHS

Week Ending April 5, 1918, to August 30, 1918

Annual Death Rate per 1000 for All Troops in U. S.....18.

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF DEATHS	ANNUAL DEATH RATE PER 100,000
1	Gordon	36.4	5	32.
2	Lee	42.5	5	28.
3	Upton	34.5	4	28.
4	Meade	36.3	4	26.
5	Pike	36.5	4	26.
6	Dodge	31.2	3	23.
7	Sherman	32.8	3	22.
8	Taylor	34.7	3	20.
9	Grant	36.4	3	20.
10	Logan	15.1	1	16.
11	Travis	31.2	2	15.
12	Sheridan	15.9	1	15.
13	Jackson	33.4	2	14.
14	Kearny	19.4	1	12.
15	Fremont	19.9	1	12.
16	Dix	46.1	2	10.
17	Funston	25.1	1	9.
18	Hancock	25.5	1	9.
19	Lewis	34.2	1	7.

F. TUBERCULOSIS

Cases of tuberculosis are not reported weekly by telegraph to the Surgeon General's office, and we have therefore, but a record of the deaths from this cause. There have been relatively few deaths from tuberculosis as compared with certain other diseases. However, inasmuch as the American soldier is supposed to pass a rigid physical examination before entering the army, we may regard the death rate from this cause as unnecessarily high. During the winter of 1917-18 the highest rates are found at Wheeler, Pike, Beauregard, Wadsworth and Sherman, these camps being represented by personnel from the south and east. Tuberculosis deaths were less during the summer.

TABLE 20

TUBERCULOSIS—FOUR AUTUMN MONTHS

Week Ending September 6, 1918, to December 27, 1918

Annual Death Rate per 1000 for All Troops in U. S.....46.

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF DEATHS	ANNUAL DEATH RATE PER 100,000
1	Humphreys	24.1	5	64.
2	Gordon	29.3	5	52.
3	Meade	42.1	7	51.
4	Jackson	38.2	6	48.
5	Beauregard	13.7	2	45.
6	Taylor	54.9	7	39.
7	Funston	49.0	6	38.
8	Hancock	34.0	4	36.
9	Grant	35.0	4	35.
10	Travis	32.3	3	28.
11	Wheeler	12.5	1	25.
12	Upton	27.9	2	22.
13	Lee	43.8	3	21.
14	Sherman	30.9	2	20.
15	Dix	35.0	2	18.
16	Custer	36.1	2	17.
17	Johnston	19.7	1	16.
18	Greenleaf*	19.9	1	15.
19	Sheridan	22.0	1	14.
20	Pike	44.2	2	14.
21	Sevier	23.3	1	13.
22	Lewis	35.3	1	9.
23	Devens	39.5	1	8.

*Greenleaf—12 weeks—Week ending June 14, to Aug. 30.

Nineteen camps reported deaths. In the autumn twenty-three camps reported deaths, the rates during the season running up to 64. Of the camps which stood among the first five in the winter table, none are represented in the first five of the summer table, or in the autumn table. Two camps which stood high during the summer, namely, Meade and Gordon, were likewise within the first five during the autumn. The number of deaths was not over seven per camp during either season. (See Tables 19, 20.)

G. DIPHTHERIA

During the winter season, deaths from diphtheria were reported in seven out of twenty-nine large camps. In the summer but six camps reported deaths, and in the autumn but one. At no camp during the summer and fall was more than one diphtheria death registered. (See Table 21.)

From Aug. 25, 1917, to May 31, 1918, there were 62 cases of diphtheria with three deaths at Cody. This is about one-fourth the measles incidence. Of 3500 cultures taken among men as they arrived in the recruit camp, 27 carriers were found. This is .77 per cent. In most of the regiments about one per cent of the strength were carriers. Few carriers gave a previous history of the disease. Chronic carriers frequently gave history of sore throat and those with hypertrophied tonsils cleared up after the tonsils were removed. It was the custom to isolate and treat carriers four times daily with dichloramine-T solution.

From June 1 to Aug. 31, there were nine diphtheria cases without fatality at Cody. The incidence during the winter was about 7 per month and for the summer 3 per month.

TABLE 21

DIPHTHERIA—FIVE SUMMER MONTHS

Week Ending April 5, 1918, to August 30, 1918

Annual Death Rate per 1000 for All Troops in U. S..... .84

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF DEATHS	ANNUAL DEATH RATE PER 100,000
1	Dodge	31.2	1	7.
2	Sherman	32.8	1	7.
3	Jackson	33.4	1	7.
4	Lewis	34.2	1	7.
5	Meade	36.3	1	7.
6	Dix	46.1	1	5.

FOUR AUTUMN MONTHS

Week Ending September 6, 1918, to December 27, 1918

Annual Death Rate per 1000 for All Troops in U. S.....1.0

1	McClellan	24.6	1	12.

Dodge and Grant each reported 7 cases of diphtheria and no deaths from June 1 to Sept. 1. Sherman had 21 cases and no deaths in the same time and Fremont 4 cases. One of these was contracted in the base hospital, the patient being readmitted with this diagnosis following one day's release from a 25-day detention in the hospital. Six carriers were found in the ward first occupied by the patient. There was but one case of diphtheria, non-fatal, at Meade during July and August.

Our record of cases of diphtheria is incomplete as no weekly report is made. We may say that diphtheria has been a disease of minor consequence in the American Army.

H. TYPHOID FEVER

As has already been pointed out in the tables for the army as a whole, typhoid fever and its associated diseases, the paratyphoids, have been very infrequent during the summer and autumn seasons of 1918. (See Tables 22 and 23.) Admissions have varied from one to nineteen, the latter number being reported from Camp Lee during the summer. The admission rate for Lee, however, was not over 1.1 per 1000, whereas during the previous winter the rates of Dix and Bowie were 2.1 and 4.1, respectively. Typhoid was reported at twenty-four of the large camps during the summer, and at twenty-three during the autumn. As a rule it has been the southern camps rather than the northern and western which have reported the most typhoid. In the autumn Logan stands at the top of the table with an admission of 1.3. Forrest has the same rate, but this merely represents four cases during four months.

Sherman reports a colored soldier arriving in camp June 20 who was taken ill the next day and admitted to the hospital with typhoid fever. He had not received the typhoid vaccination. Another colored soldier arriving in camp June 19, was admitted to the base hospital June 25, diagnosis undetermined. On July 1 the case was pronounced typhoid. This man had received his first typhoid prophylactic.

Two cases of typhoid and one of paratyphoid occurred at Meade in August among recruits from the rural districts of Kentucky. The two typhoid cases had received the first immunizing dose of triple typhoid vaccination in July. The second dose was given at Meade on July 27. In one of these cases the third dose was given a few days before admission to the hospital. The paratyphoid case had received the typhoid vaccination in June, 1917, and paratyphoid in July, 1917.

TABLE 22

TYPHOID AND PARATYPHOID—FIVE SUMMER MONTHS

Week Ending April 5, 1918, to August 30, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....0.26

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000	NUMBER OF DEATHS
1	Greene*	7.5	1	1.7	0
2	Sevier	19.5	10	1.2	0
3	Lee	42.5	19	1.1	2
4	Sheridan	15.9	6	.9	0
5	Shelby	20.5	7	.8	1
6	Jackson	33.4	11	.8	3
7	Wadsworth	21.7	6	.7	1
8	Johnston	17.6	4	.5	1
9	Gordon	36.4	7	.5	2
10	Travis	31.2	5	.4	1
11	Bowie	19.1	3	.4	1
12	Sherman	32.8	4	.3	1
13	Devens	36.1	4	.3	0
14	Beauregard	22.1	2	.2	0
15	Cody	24.5	2	.2	0
16	Logan	15.1	1	.2	0
17	Pike	36.5	2	.1	2
18	Fremont	19.9	1	.1	0
19	Hancock	25.5	1	.1	0
20	Funston	25.1	1	.1	0
21	Custer	26.5	1	.08	0
22	Upton	34.5	1	.07	0
23	Lewis	34.2	1	.06	0
24	Meade	36.3	1	.06	0

*Greene—3 weeks—Week ending Aug. 16, to Aug. 30.

Three cases of typhoid reported from Devens were admitted to the hospital almost directly from civilian life.

Custer reports the case of a soldier who was inducted into the service on August 26 prior to which date he had been at home where a sister was ill of typhoid. This man received his first inoculation August 28 and his second September 4. He was admitted to the base hospital with typhoid on September 10.

Typhoid carriers are not numerous if we may judge by the reports from Fremont. Cooks and food handlers to the number of 1,037 were examined by cultures from stools and urine during May and June. But one carrier was found and he gave no previous history of typhoid. His typhoid prophylaxis had been completed the year previous.

TABLE 23

TYPHOID AND PARATYPHOID—FOUR AUTUMN MONTHS

Week Ending September 6, 1918, to December 27, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....0.27

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000	NUMBER OF DEATHS
1	Logan	14.3	6	1.3	0
2	Forrest	9.2	4	1.3	0
3	Pike	44.2	12	.8	1
4	Fremont	12.9	3	.7	0
5	Gordon	29.3	7	.7	2
6	Funston	49.0	1	.6	3
7	Cody	5.9	1	.5	0
8	Sheridan	22.0	4	.5	0
9	Wheeler	12.5	2	.5	1
10	Lee	43.8	7	.5	1
11	Meade	42.1	5	.4	1
12	MacArthur*	20.7	3	.4	0
13	Beauregard	13.7	2	.4	0
14	Greene*	16.6	2	.4	0
15	Greenleaf*	19.9	1	.2	0
16	McClellan	24.6	2	.2	0
17	Shelby	12.1	1	.2	2
18	Wadsworth	15.3	1	.2	0
19	Custer	36.1	3	.2	2
20	Devens	39.5	2	.2	0
21	Sherman	30.9	1	.1	0
22	Travis	32.3	3	.1	1
23	Upton	27.9	1	.1	0

*MacArthur—17 weeks—Week ending May 10, to Aug 30.
*Greene—3 weeks—Week ending Aug. 16, to Aug. 30.
*Greenleaf—12 weeks—Week ending June 14, to Aug. 30.

It is true that the death rate from this cause for the army as a whole increased from winter to autumn, but in view of the few cases involved there is little significance attached to this.

I. VENEREAL DISEASES

The highest admission rates for the venereal diseases were during the summer; 820 per 1000 at Syracuse, and 736 at Greene. As the period of time covered by these rates is not over three weeks, we may look upon the rate of 546 at Wadsworth as the highest. This rate is higher than that at Pike, which headed the table the previous winter season, with a rate of 312. Pertinent data are shown in Tables 24 and 25 for the summer and autumn seasons. The five camps which stood the highest in the winter of 1917-18 were Pike, Jackson, Lee, Travis, and Logan. During the summer months the five highest camps were Wadsworth, Jackson, Custer, Upton and Sheridan; and during the autumn, Bowie, Dix, Pike, Syracuse and Wadsworth. There is little significance to be attached to these figures without knowing the personnel and the recruit arrivals. As shown in the last column of the autumn table a very great majority of venereal cases existed prior to entering the army. The figures showing "per cent of new cases" must be regarded as indicatory, however, rather than absolute, for the method of reporting venereal diseases has not been worked out in a wholly satisfactory manner, and for that reason some camps have reported with much greater accuracy and thoroughness than others, and it is these camps which as a consequence may have the highest percentage of new to total cases.

TABLE 24

VENEREAL DISEASES—FIVE SUMMER MONTHS

Week Ending April 5, 1918, to August 30, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....156.

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000
1	Syracuse*	13.5	426	820.
2	Greene*	7.5	319	736.
3	Wadsworth	21.7	5028	546.
4	Jackson	33.4	6359	449.
5	Custer	26.5	3662	326.
6	Upton	34.5	4668	319.
7	Sheridan	15.9	2042	303.
8	Lewis	34.2	4137	286.
9	MacArthur*	15.5	1415	279.
10	Gordon	36.4	4011	260.
11	Lee	42.5	4140	229.
12	Funston	25.1	2384	225.
13	Dodge	31.2	2412	182.
14	Sherman	32.8	2438	175.
15	Logan	15.1	975	152.
16	Beauregard	22.1	1356	145.
17	Sevier	19.5	1145	139.
18	Meade	36.3	2017	132.
19	Devens	36.1	1891	124.
20	Johnston	17.6	924	123.
21	Hancock	25.5	1314	122.
22	Travis	31.2	1570	119.
23	McClellan	18.5	899	115.
24	Bowie	19.1	908	112.
25	Dix	46.1	2073	106.
26	Pike	36.5	1568	101.
27	Taylor	24.7	1350	92.
28	Wheeler	23.8	853	84.6
29	Las Casas*	12.8	187	84.5
30	Greenleaf*	17.7	310	76.0
31	Shelby	20.5	611	70.4
32	Cody	24.5	685	66.0
33	Kearny	19.4	465	56.6
34	Fremont	19.9	470	55.7
35	Grant	36.4	672	43.6

*Syracuse—2 weeks—Week ending Aug. 23 to Aug. 30.
*Greene—3 weeks—Week ending Aug. 16 to Aug. 30.
*MacArthur—17 weeks—Week ending May 10, to Aug. 30.
*Las Casas—9 weeks—Week ending July 5 to Aug. 30.
*Greenleaf—12 weeks—Week ending June 14 to Aug. 30.

The figures are given for what they are worth and the best we can say is that as a rule less than 10 per cent of venereal disease is contracted by men after entering the army.

J. MUMPS

The prevalence of mumps among the troops in this country must be judged from the reports of a limited number of camps. This disease is not included in the weekly telegraphic report and it is only the records sent in from the camps voluntarily that are available.

The incidence of mumps was not unlike measles numerically. During the summer months of June, July and August, 1918, reports from eight large camps show 2291 cases

TABLE 25

VENEREAL DISEASE—FOUR AUTUMN MONTHS

Week Ending September 6, 1918, to December 27, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....132.

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000	NUMBER OF CASES CONTRACTED SINCE ENLISTMENT	PER CENT NEW TO TOTAL CASES
1	Bowie	9.8	3497	1090.	53	1.5
2	Dix	35.0	10602	927.	12	.1
3	Pike	44.2	8891	616.	45	.5
4	Syracuse*	7.4	729	301.	0	0.
5	Wadsworth	15.3	1548	310.	57	3.6
6	Greene	16.6	1620	299.	45	2.7
7	Dodge	28.5	2680	288.	125	4.6
8	Beauregard	13.7	1166	260.	58	4.9
9	Upton	27.9	1603	176.	41	2.5
10	Johnston	19.7	1094	170.	427	39.
11	Jackson	38.2	1931	155.	9	.5
12	Meade	42.1	2105	153.	85	4.
13	Logan	14.3	704	151.	65	9.2
14	Shelby	12.1	554	140.	144	26.
15	Forrest	9.2	413	137.	10	2.4
16	Gordon	29.3	1160	121.	16	1.3
17	Eustis	14.0	507	111.	10	1.9
18	Lewis	35.3	1247	108.	85	6.8
19	Funston	49.0	1658	104.	9	.5
20	Hancock	34.0	1083	97.4	143	13.
21	Kearny	17.5	495	86.5	145	29.
22	Wheeler	12.5	342	83.7	15	4.3
23	Travis	32.3	871	82.5	55	6.3
24	Sheridan	22.0	519	72.2	59	11.
25	Custer	36.1	831	70.4	98	12.
26	Lee	43.8	909	63.5	58	6.3
27	Sevier	23.3	469	61.6	83	18.
28	Humphreys	24.1	482	61.2	46	9.5
29	Sherman	30.9	608	60.2	75	12.
30	McClellan	24.6	463	57.5	15	3.2
31	Cody	5.9	109	56.5	0	0.
32	Devens	39.5	647	50.1	170	26.
33	Greenleaf	19.9	284	43.6	3	1.0
34	Taylor	54.9	868	48.3	78	8.9
35	Fremont	12.9	178	42.2	42	24.
36	MacArthur	20.7	279	41.2	71	25.
37	Grant	35.0	468	40.6	0	0.
38	Las Casas	12.8	111	26.5	0	0.

*Syracuse—13 weeks—Week ending Sept. 6, to Nov. 29.

of mumps to 1699 cases of measles. (See Table 26.) There was 35 per cent more mumps than measles. The excess of mumps over measles was somewhat less during the previous winter period, when there were reported from nine camps 14,717 cases of mumps and 11,816 cases of measles, mumps being 25 per cent greater.

TABLE 26

WINTER AND SPRING 1917-18

CAMP	PERIOD	NO. WEEKS	MEASLES	MUMPS
Devens	10/1/17-7/31/18	43	785	778
Taylor	10/3/17-12/31/17	13	903	114
Cody	8/25/17-5/31/18	39	235	104
Kearny	10/7/17-5/3/18	37	1538	1674
Lee	10/1/17-4/30/18	30	1143	3363
Beauregard	9/1/17-5/3/18	38	2627	3569
Johnston	12/24/17-4/30/17	18	447	591
Sevier	8/28/17-4/30/18	35	3576	3217
McClellan	10/1/17-4/30/18	30	542	307
Total			11816	14717

SUMMER 1918

Dodge	June 1-Aug. 31	13	525	369
Cody	"	13	141	119
Sherman	"	13	82	116
Grant	"	13	141	348
Gordon	"	13	312	936
Fremont	"	13	94	92
Sevier	"	13	344	278
Meade	July 1 to Aug. 31	9	60	33
Total			1699	2291

The Annual Report of the Surgeon General for the entire year 1917 gives 47,573 measles admissions to 21,725 for mumps. After Jan. 1, mumps appeared in greater numbers than measles.

As between the cold and warm weather periods (and it must be remembered in this connection that the cold weather is coincident with the earliest days of the men in camp whereas the warm period covers the termination of the training) mumps was more frequent in the former. Expressed as an annual rate per 1000 the rates for the winter and spring period were as follows:

The summer rates were:

Beauregard	252.	Gordon	94.6
Sevier	182.	Sevier	73.6
Lee	182.	Dodge	41.7
Kearny	112.	Grant	37.5
Devens	31.2	Cody	19.7
McClellan	21.9	Fremont	16.1
Taylor	17.5	Sherman	14.1
Cody	6.3	Meade	5.1

Mumps was more prevalent among the southern than northern troops in the winter. The climatic influence during the summer can not be judged owing to the paucity of the data.

During the month of May recruits of the April draft located in the Depot Brigade at Camp Grant contributed nearly all of the 149 cases of mumps occurring in that month. Mumps was most common among the negro troops from June 1 to Aug. 31. It assumed epidemic proportions in June following the arrival of negro recruits from the southern states. Cases again increased in number after the arrival of another lot of colored recruits on July 30. Some cases developed among men who had been in camp less than 48 hours. The cases were sporadic among white troops.

From Sept. 1 to Oct. 1, 1918, there were 238 cases at Grant, 90 per cent of which were among colored men of the development and labor battalions. Only 5 per cent of these cases were among new recruits.

During 1917 there were but eight deaths among 21,725 cases in the army in this country. The greatest objection to mumps is that it makes soldiers noneffective, constituting a burden to the base hospital. In 1917 this disease kept men in the hospital 11.7 days as compared to 11.3 days for measles. During the winter season at Kearny mumps caused 11.7 per cent of all admissions to the hospital and quarters. The average time for each case in the hospital was 12 days.

Capt. Burns, epidemiologist at Camp Lewis believes that greater caution should be used in handling mumps. He says "the men are sick. They are taken to the one place in camp where other contagious diseases are cared for. They tax the service and are often exposed to cross infection. The men are weak for a considerable time after being discharged to duty." A serious phase of the question is sounded by Capt. Burns when he reports that "33 per cent of the cases of mumps admitted to the base hospital in 1918 were complicated by orchitis." This complication was far more frequent at Lewis than at other camps of which we have record. Devens reports that complications were few and that no disability followed the disease. Orchitis is reported as rare at Cody.

At Kearny mumps has differed from measles and in fact from most other diseases in its relatively belated appearance in camp. Thus at Kearny during the period Sept. 7, 1917, to May 31, 1918, only 10 per cent of 1674 cases occurred prior to Jan. 1. During the same period 88 per cent of measles had occurred, 65 per cent of bronchitis, 38 per cent of tonsillitis, 33 per cent of diphtheria, 21 per cent scarlet fever, 74 per cent epidemic cerebrospinal meningitis, 75 per cent lobar pneumonia, and 71 per cent of bronchial pneumonia. The distribution of 1674 cases of mumps by months was as follows:

		PER CENT OF TOTAL NUMBER
(1917)	Sept.	.4
	Oct.	.6
	Nov.	3.5
	Dec.	6.2
(1918)	Jan.	13.6
	Feb.	30.8
	Mar.	45.8

The same experience is reported from Cody where the cases by months were:

		NUMBER OF CASES
(1917)	Aug.	1
	Sept.	1
	Oct.	2
	Nov.	2
	Dec.	3
(1918)	Jan.	7
	Feb.	12
	Mar.	25
	Apr.	20
	May	31

While the disease was frequently introduced by draft increments it was by no means confined to men just entering camp, as is shown by the following analysis at Cody:

LENGTH OF SERVICE	NO. OF CASES
1 month or less	30
1 to 2 months	40
2 to 3 months	27
Over 3 months	22

K. OTHER DISEASES

Most prominent among diseases which have not been touched upon, exclusive of pneumonia, were the minor respiratory affections variously labeled *bronchitis, tonsillitis* and *influenza*. The exact number of these we shall never know, for many escaped record. The number given as having been admitted to the hospital is but a partial record.

From June 1 to Aug. 31, Sherman admitted 202 cases of tonsillitis and 16 of influenza, the latter having no laboratory confirmation. Fremont at this time reported 18 cases of *Vincent's Angina*. Gordon informs us that "colds, bronchitis, sore throat, and kindred affections have been prevalent in this command—and has predisposed to the graver respiratory diseases."

The most annoying feature of these minor infections is the complication likely to develop. Epidemiologists who have studied the matter closely have observed that not infrequently pneumonia is preceded by some form of cold. Thus at Camp Dodge during the summer season an investigation of 33 pneumonia cases proved that 25 were preceded by either colds, la grippe, bronchitis or influenza. Major Woolley of Devens reports that in a very large majority of the pneumonia cases during the summer season the onset was not sharp, but was preceded by a complaint of coughs, colds, etc. He believes that patients with acute infections of the upper respiratory tract should be regarded as possible future subjects of pneumonia. We believe this to be generally true in spite of the fact that the Surgeon General's Report for 1917 gives among 10,668 cases of pneumonia but 20 following bronchitis, 19 following influenza, 7 following tonsillitis and 2 following laryngitis. Many of the so-called primary pneumonias follow in the wake of a debilatory cold of which there is no record.

The evidence of Fremont on the west coast is contrary to the above, for during June, July, and August, 1918, the majority of 51 cases of lobar pneumonia gave no previous history of bad colds, bronchitis or tonsillitis.

The autumn season of 1918 witnessed an increasing number of minor respiratory affections before the advent of influenza.

German Measles has been common in many camps, but the statistical data are unreliable owing to confusion with measles. Cody reports that great care was exercised in differentiating the two measles and from Aug. 25, 1917, to May 31, 1918, 1315 cases of German measles were reported and but 235 measles.

In the entire year, 1917, there were but 8,982 German measles cases among the troops in this country as against 47,573 measles.

In the summer months of June, July and August, Cody reported but 2 German measles to 141 measles. Curiously enough, these identical figures represent the situation at Grant during the summer. Fremont reported 14 German measles and 94 measles, Sevier 7 German measles and 344 measles. If we may rely upon the diagnosis, German measles was much less common during the warm months than during the winter.

Chicken pox was infrequent. In 1917, this disease amounted to but 0.6 per cent of measles. During June, July and August Gordon reported one case, Fremont 4 cases and Grant 2 cases.

Whooping cough was likewise almost unknown. But 25 cases occurred in 1917 and none to our knowledge in 1918.

Smallpox was more prevalent than chicken pox, judged by the few reports available for the warm period of the summer season. Cody had one case, a recruit from Oklahoma who entered the hospital four days after his arrival in camp. Dodge reported eight cases

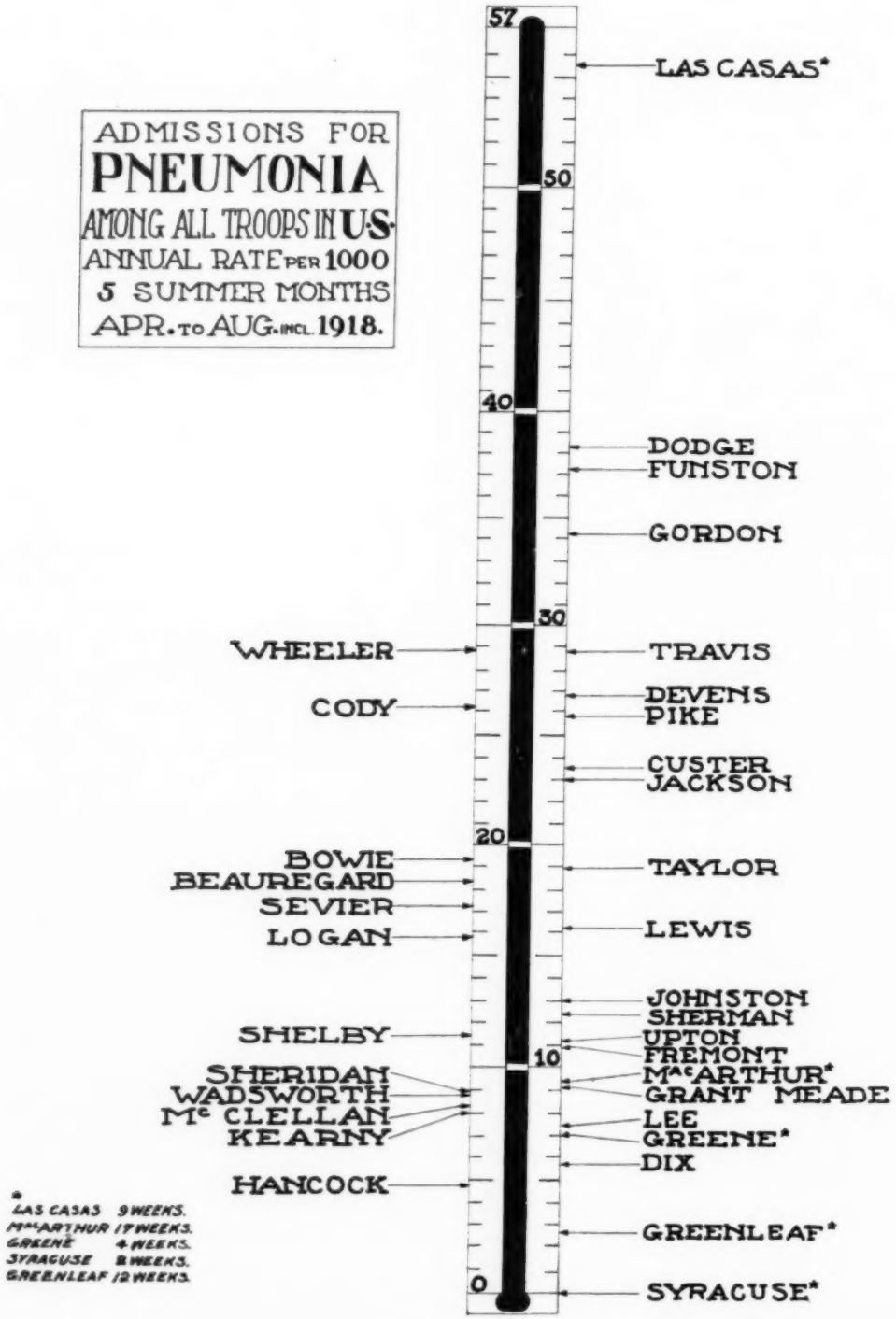
ADMISSIONS FOR
PNEUMONIA
AMONG ALL TROOPS IN U.S.
ANNUAL RATE PER 1000
5 SUMMER MONTHS
APR. TO AUG. INCL. 1918.
57
50
40
30
20
10
0
LAS CASAS*
DODGE
FUNSTON
GORDON
WHEELER
TRAVIS
CODY
DEVENS
PIKE
CUSTER
JACKSON
BOWIE
BEAUREGARD
SEVIER
LOGAN
TAYLOR
LEWIS
JOHNSTON
SHERMAN
SHELBY
UPTON
FREMONT
SHERIDAN
WADSWORTH
Mc CLELLAN
KEARNY
MacARTHUR*
GRANT MEADE
LEE
GREENE*
DIX
HANCOCK
GREENLEAF*
SYRACUSE*
* LAS CASAS 9 WEEKS.
MacARTHUR 17 WEEKS.
GREENE 4 WEEKS.
SYRACUSE 8 WEEKS.
GREENLEAF 12 WEEKS.

CHART XXVI.

from June 1 to Aug. 31. Two of these cases were drafted men arriving in camp in the eruptive stage. Grant had two cases, Sevier nine.

Fremont reported one case of *anthrax* during the summer. Two cases of localized anthrax occurred at Camp Lewis during June and July which were diagnosed both clinically and bacteriologically. These cases occurred at the time the 91st Division left camp. En route to Hoboken 11 more cases were discovered and transferred to the Base Hospital at Camp Merritt. These cases were mild in type, "the lesion being located upon the shaven area of the neck." There are other instances known where anthrax was proved to have been transmitted by infected shaving brushes.

Bacillary dysentery, to the number of 12 cases with two deaths was reported from Meade during July and August. This was coincident with a sharp rise in gastrointestinal disorders and diarrheas about the middle of August and due to a temporary breakdown in the chlorination of the water. As will be seen in Chart X dysentery of an unstated form was more prevalent in the army at large in the latter half of 1918 than in the first part. The annual rate exceeded one per 1000 on only seven occasions during 1918. Dysentery, so called, was more prevalent than typhoid.

L. PNEUMONIA DURING SUMMER SEASON

It has been thought best to separate the autumn from the summer season in discussing the pneumonia situation. This is owing to the close association between pneumonia and influenza in the autumn to which a special section of this report has been devoted. The summer season, however, may well be described here.

The highest rate for the summer season is seen from Table 27, (see also Chart XXVI) to be at Camp Las Casas which is located in Porto Rico. The admission rate amounted to 55.4. The record for Las Casas is limited to nine weeks as the camp was not opened until the first week in July. Of the camps for which there is a complete record of twenty-two weeks, Dodge stands first with a rate of 38.2. This is 11 higher than the Dodge rate for the previous winter. During the winter there were six camps with rates higher than that of Dodge and four camps higher that that of Las Casas.

The higher rate at Las Casas is readily explained by the newness of the camp and the assembling of recruits. Most of this pneumonia occurred prior to the middle of August. The measles epidemic followed after the peak of the pneumonia outbreak, a sequence which has rarely been met with at other camps. Although Camps Dodge, Funston, Gordon, Devens and Custer occupied a relatively high position in the summer table which is contrary to their position the previous winter, still for the most part it is the camps of southern troops which continue to occupy the upper half of the rate table. Summer pneumonia was for the most part sporadic rather than epidemic, and a good deal of it occurred during April. There was very little during the warm months of the year. In fact Dodge's high rate was due to a rather sharp outbreak during April. If the facts were known we could probably trace most of the pneumonia of the entire period to the entrance of recruits at the camps. However, the admission of new men during the warm summer months is attended with less pneumonia than in the winter season.

The case mortality of pneumonia during the summer averaged less than during the previous winter. There is a variation among the camps from about 7 per cent to 100 per cent. Omitting the last figure, which record is for two weeks only at Syracuse, and omitting a rate of 50 per cent at Camp Greene whose rate is for but three weeks, the highest mortality is at Dodge, this figure amounting to 33 per cent. The summer pneumonias were for the most part, lobar rather than bronchial. Thus at Dodge of 40 cases occurring between August 5 and September 3 and of which 33 were carefully investigated, it was found that 26 were lobar pneumonia and only one primary bronchopneumonia. It may further be noted that there was but one instance in which two cases were reported from the same company, all other cases being scattered throughout the camp. Of the 33 cases which were inquired into, 25 followed an attack of either cold, grippe, bronchitis or influenza.

Funston is second in the table with a rate of 37.2. The pneumonia which occurred

TABLE 27

PNEUMONIA—FIVE SUMMER MONTHS

Week Ending April 5, 1918, to August 30, 1918

Annual Admission Rate per 1000 for All Troops in U. S.....14.8

ORDER	CAMP	AVERAGE STRENGTH IN THOUSANDS	NUMBER OF ADMISSIONS	ANNUAL ADMISSION RATE PER 1000	NUMBER OF DEATHS	PER CENT CASE MORTALITY
1	Las Casas*	12.8	123	55.4	17	14.
2	Dodge	31.2	505	38.2	168	33.
3	Funston	25.1	395	37.2	75	19.
4	Gordon	36.4	533	34.1	118	22.
5	Wheeler	23.8	290	28.8	43	15.
6	Travis	31.2	380	28.7	64	17.
7	Devens	36.1	409	26.7	46	11.
8	Cody	24.5	272	26.2	38	10.
9	Pike	36.5	379	25.8	104	27.
10	Custer	26.5	264	23.5	48	18.
11	Jackson	33.4	325	23.0	59	18.
12	Bowie	19.1	156	19.3	19	12.
13	Taylor	34.7	248	18.9	52	21.
14	Beauregard	22.1	173	18.4	15	8.7
15	Sevier	19.5	143	17.3	19	13.
16	Lewis	34.2	235	16.2	34	14.
17	Logan	15.1	101	15.9	7	6.9
18	Johnston	17.6	97	13.0	8	8.2
19	Sherman	32.8	172	12.4	47	27.
20	Shelby	20.5	99	11.4	11	11.
21	Upton	34.5	163	11.2	35	21.
22	Fremont	19.9	92	10.9	17	18.
23	MacArthur*	15.5	47	9.3	6	13.
24	Greene*	7.5	4	9.2	2	50.
25	Grant	36.4	139	9.0	39	28.
26	Meade	36.3	138	9.0	22	16.
27	Sheridan	15.9	60	8.9	15	25.
28	Wadsworth	21.7	80	8.7	11	14.
29	McClellan	18.5	64	8.2	6	9.4
30	Kearny	19.4	64	7.9	6	9.4
31	Lee	42.5	134	7.4	19	14.
32	Dix	46.1	110	5.6	21	19.
33	Hancock	25.5	50	4.7	6	12.
34	Greenleaf*	17.7	11	2.7	2	18.
35	Syracuse*	13.5	0	0	1	100.+

*Las Casas—9 weeks—Week ending July 5 to Aug. 30.
*MacArthur—17 weeks—Week ending May 10, to Aug. 30.
*Greene—3 weeks—Week ending Aug. 16 to Aug. 30.
*Greenleaf—12 weeks—Week ending June 14 to Aug. 30.
*Syracuse—2 weeks—Week ending Aug. 23 to Aug. 30.

between June 15 and August 15 and which amounted to 103 cases, was confined for the most part to the June and July draft of Louisiana and Oklahoma negroes. The following table is interesting in this connection. The figures represent the number of cases per thousand strength during the period above mentioned:

JUNE DRAFT		JULY DRAFT	
White men	0	White men	.3
Missouri negroes	0	Missouri negroes	1.
Oklahoma negroes	4.	Kansas negroes	1.
Louisiana negroes	2.6	Mississippi negroes	4.

In the June and July drafts there were received 27,000 white men, who furnished four cases of pneumonia from June 15 to August 15. During the same period, 12,000 colored draft men provided 83 cases of pneumonia.

The sporadic nature of the pneumonia during the summer is borne out by testimony from many camps. Fremont reported that of 78 cases, all of which were primary pneumonia, no two cases occurred among men of the same company. Gordon stands next to Funston with a rate of 34.1. During the entire summer season there were 533 cases of pneumonia reported. In the period from June 1 to September 8 there were 257 cases of pneumonia, all of which were lobar. Only four of these followed measles.

Camp Jackson states that most of the cases during the summer occurred in newly drafted men and it was attributed to their change of environment. These men came from rural communities. They developed a "barracks cough" which seemed to make them more susceptible to pneumonia. At Grant, pneumonia was confined for the most part to the 161 Depot Brigade and the colored organizations. From June 1 to September 10 there were 85 cases of pneumonia at Beauregard. Eighty of these were lobar. Of the 85, 70 were primary, three followed measles, five followed colds, grippe or bronchial influenza and four were postoperative. Sixty-three of the 85 cases had seen less than one month's service. The proportion of bronchial pneumonia among camps during June, July and August was as follows:

CASES OF PNEUMONIA

CAMP	LOBAR	BRONCHO	PER CENT OF BRONCHO-PNEUMONIA
Shelby	41	40	49.
Sevier	31	21	40.
Meade*	23	15	40.
Fremont	51	27	35.
Sherman	54	12	18.
Beauregard	80	5	5.9
Dodge	31	2	5.7
Gordon	257	0	0

*July and August only.

Beauregard's case illustrates the general trend of the pneumonias from winter to summer. From September, 1917, to May, 1918, inclusive, 61 per cent of pneumonias were bronchial. In the three warm summer months, as shown above, the bronchial pneumonias amounted to but 5.9 per cent.

The mortality from each of the two forms of pneumonia in the warm summer months we can judge only from the figures available for a few camps, thus:

CAMP	LOBAR PNEUMONIA			BRONCHOPNEUMONIA		
	Cases	Deaths	% Case mortality	Cases	Deaths	% Case mortality
Fremont	51	8	16.	27	4	15.
Sevier	31	4	13.	21	3	14.

There were but three deaths among 85 pneumonias at Beauregard. One of the deaths was due to lobar pneumonia as determined by autopsy. The form of the other two is not stated.

Meade had one death among 38 pneumonias during July and August.

Sherman for the same period reported 4 deaths among 66 pneumonias. The division of the deaths among the two forms of the pneumonia is not given.

We may sum up this scattered and scanty evidence with the statement that summer pneumonia was for not far the most part lobar in type and relatively more fatal in character.

We can not conclude this brief discussion of the spring and summer pneumonias

without quoting from a report on the subject by Major Woolley of Camp Devens. The report is for the brief period from August 1 to 28 and discusses the causes of pneumonia among 34,406 white men and 3950 negroes. There were 20 cases among the white and 68 among the negroes. The white incidence amounts to an annual rate per 1000 of 7.5; that for the blacks to 226. One death occurred among the negro cases. This case mortality rate of less than 2 per cent for the entire group is astonishingly low.

The colored troops were mostly from Florida. They differed from the whites in having experienced a change of climate and although this was the warm season, the changes from day to day and the change from warm days to cool nights were different from what the colored troops had been accustomed to. Coupled with this factor was the shortage of bedding. Each man was furnished with a cotton comforter which was adequate for northern men, but not sufficient to keep the southern man warm on the cool nights of which there were many.

The colored men were worked harder than had been their custom in civil life and carelessness in cooling off after severe physical exertion was another factor that may have lowered their resistance.

Chronic infections were widely prevalent among the colored troops. Of 50 negro pneumonia patients, 25 gave histories of previous malaria, 31 had gonorrhea, 11 admitted syphilis, and hookworm had been actually demonstrated in five. In 21 cases two or more of these infections were present. Of the white cases one gave a malarial history, one of gonorrhea, one of lues. None had hookworm. Ten of 50 colored men had had pneumonia before. Four of the white cases had had pneumonia previously. The proportion of previous pneumonia was thus the same in both. Both white and colored men lived in overcrowded quarters. Certain barracks intended for 216 men were occupied by over 300 and in one case by 376.

In the three respects listed above—exposure, fatigue, and constitutional well-being—the two races differed. It is Major Woolley's belief that entirely apart from the question of the prevalence of infecting bacteria, this combination was responsible for raising the sick rate among the negroes to ten times the figure of the whites.

Further analysis of the causes of pneumonia will appear in the discussion of influenza and its complications, which is being prepared for the volume on *Communicable Diseases* to appear in the *Medical and Surgical History of the War.*

THE ROLE OF THE PATHOLOGIST IN THE PRACTICE OF MEDICINE*

By Wm. Carpenter MacCarty, M.D., and Albert Compton Broders, M.D., Rochester, Minn.

THE definition of pathology clearly states that pathology is the science of disease, its nature and cause. It being a comparatively recently developed science, its importance as a routine clinical diagnostic adjunct has only begun to be realized. In fact the pathologist has been generally thought of by most clinicians as an interesting luxury—a corrector or confirmer of diagnoses after the patient is dead. This statement seems strange to pathologists who have conscientiously devoted their lives to training students and investigating intricate problems of disease. Some pathologists undoubtedly bear a close relation to patients, but the majority of pathologists, throughout the world, for technical reasons, spend most of their time apart from patients and practical clinicians. Few are clinical consultants who have to do directly with living patients and few general clinicians consider them worthy of the status of clinical consultant.

In the early history of medicine, clinicians knew all that was known of pathologic conditions and processes simply because little was known about them. As opportunities for increased knowledge of disease arose as a result of detailed postmortem examinations and other laboratory procedures connected with the study of disease, some one individual was kept busy dealing with the material and technic associated with such opportunity. That individual was known as the pathologist—the clinician dealt largely with histories, symptoms, signs and treatment.

While these are general facts concerning the functions of these two important members of the medical profession, each is modifying his functional efficiency; the clinician is studying pathologic conditions and processes and the pathologist is gradually but perhaps too slowly beginning to associate himself intimately with the patient and his clinical colleagues.

Scientific efficiency can only be obtained by one method; namely, that of having the clinician intimately associate himself with the work and judgment of the pathologist without doing detailed laboratory technic and the pathologist associate himself with the work and judgment of the clinician in his study of the patient without doing routine technical procedures for which the clinician is especially trained. Each of these specialists has more than he can do, but together they can readily do more for the patient and science than either one alone. This is cooperative specialism which reveals itself in the accompanying figures which represent the part played by a group of clinical and research pathologists working intimately with a group of clinicians. The statistics represent the laboratory reports made on 49,083 patients registered during the year 1918.

*Read before the American Association of Pathologists and Bacteriologists, June, 1919, and the Southern Minnesota Medical Association, June, 1919.

I. Metabolic rates determined		2,875
II. Gastric analyses made		9,560
III. Bacteriological and serological examination:		
Sputum	1,989	
Stools	2,488	
Cultures (general)	1,510	
Smears (general)	491	
Vaccines	120	
Wassermanns	21,994	
Blood grouping	583	
Skin tests	441	
Special examinations	1,736	
Stains for B. tuberculosis (urine)	968	
Positive tuberculosis sputum	299	
Total number		32,619
IV. Urine examinations:		
General	7,981	
Functional	6,891	
24-hour specimens	47,784	
Ureteral specimens	3,591	
Special examinations	193	
General and functional	2,586	
Total number		69,026
V. Blood examinations:		
Complete cell counts	2,337	
White cell counts	939	
Other tests (specials)	722	
Hemoglobin determinations	5,614	
Incomplete counts	20,573	
Coagulation and special examinations	538	
Total number		30,723
VI. Miscellaneous examinations		83
VII. Autopsies		530
VIII. Electro-cardiographic record		1,285
IX. Fresh tissue examinations (living patients)		11,147
Total number of pathologic reports		157,848

The last figure (157,848) represents the number of laboratory reports on 49,083 patients and not the number of laboratory examinations, for each involves frequently many examinations and tests.

The pathologist's reports represented by these figures have one or more of the following values to the patient and clinician:

1. *They confirm the diagnosis of which there might be a clinical suspicion,* i. e., the clinician suspects that an ulcer of the lip or stomach is malignant and the microscopic examination confirms the suspicion.

2. *They actually make the diagnosis in which there is no clinical diagnostic suspicion,* i. e., the clinician obtains a history of a gastric lesion, which, upon exploration appears to be an extensive carcinoma—microscopic examination reveals the gastric lymphatic glands inflammatory. The patient has a negative preoperative Wassermann reaction and the specimen after the resection for the obstructive mass reveals an inflammatory condition which turns out to be syphilitic, confirmed by a positive postoperative Wassermann reaction. The diagnosis and prognosis are considerably altered.

3. *They recognize accessory pathologic conditions,* i. e., the clinical diagnosis of myomata of the uterus is followed by subtotal hysterectomy and a car-

cinomatous growth is found in one of the horns of the uterus, or a young female has a large mammary cyst but after its removal, a small carcinoma is discovered in the vicinity of the cyst by the pathologist. Such accessory findings alter the degree of operative intervention and change the prognosis.

4. *They correct the clinical diagnosis,* i. e., the clinician makes a diagnosis of, and the surgeon removes a sigmoid mass which the pathologist discovers is simply a sigmoid peridiverticulitis or excises an ulcer of the lip for epithelioma, and it is found to be a syphilitic ulcer or starts to remove an appendiceal fistula and the pathologist, from the secretion, shows the presence of actinomyces. The last condition should alter the surgical procedure because the patient would undoubtedly still have a postoperative fistula.

5. *They confirm the positive clinical diagnosis,* i. e., the clinician makes a diagnosis of syphilis from the presence of a small scar on the prepuce; the patient gives no history of primary or secondary syphilitic lesions but admits the great possibility and the pathologist reports a positive Wassermann or the clinician diagnoses an endocarditis and streptococci are found in the blood or there is a chronic inflammatory condition of the urinary bladder with pus in the urine and the clinician makes a diagnosis of tuberculosis from the history and the presence of an old tuberculous focus in the lungs—the pathologist demonstrates the B. tuberculosis in the catheterized ureteral urinary specimen, or a patient has a profuse hemorrhage from the uterus after menopause, there being no pelvic mass; a diagnosis of malignancy is made and the scrapings reveal a carcinomatous polyp.

6. *They determine the degree of the process of disease,* i. e., the surgeon makes a gross diagnosis of carcinoma of the stomach and finds a nodule in the liver which he thinks is a metastasis, in which case he probably would not resect the stomach but the sections from the nodule reveal an inflammatory condition which may or may not surround a gallstone which had become ulcerated into the liver substance. The degree or extent of the disease is determined and the surgeon is led to resect a portion of the stomach.

A patient has a pathologic kidney and the degree of function is determined by the phenolphthalein and blood-urea tests.

7. *They determine the physical status of the patient preparatory to possible operation,* i. e., a patient receives a diagnosis of "exophthalmic goiter" or hyperthyroidism. The metabolic rate is greatly above normal which indicates a poor surgical risk or it is slightly above normal and indicates a good surgical risk.

8. *They help to determine the extent of the operation,* i. e., a young woman presents herself with a nodule in the breast; it is locally removed (never incised) and submitted to microscopic examination. The extent of the operation necessarily depends upon the report. A young patient has prolonged irregular uterine hemorrhage for which a reliable surgeon or clinician would hesitate to advise a hysterectomy. The uterus is curetted and the diagnosis of carcinoma is made, followed by hysterectomy.

9. *They give data for the preoperative, operative, and posthospital prognosis,* i. e., a patient has a slowly developing enlargement of the tibia; there is an enlarged lymphatic gland in the groin. Repeated Wasserman tests are negative. The examination of the gland is of prognostic value.

A patient needs an operation for removal of gallstones, bladder stones, ureteral stones, hypertrophy of the prostate, or carcinoma of the uterus, but the examination of the blood reveals a low hemoglobin and the renal functional test reveals marked anemia and renal insufficiency. The prognosis is somewhat dependent upon these findings.

10. *They determine the cause of death in nonoperative and operative cases,* i. e., in medical or operative cases not previously diagnosed the autopsy frequently clears up the diagnosis.

11. *They determine the cause of death due to false operative judgment,* i. e., patients are sometimes advised to have operations and die because of the presence of other pathologic conditions which are recognized only at autopsy. Operative procedures sometimes lead surgeons to work with tissues, the vitality of which or the character of which is such that they will not survive such treatment. This has been seen rarely in resections in which the tissues were so disturbed by anemia, inflammatory reactions or carcinoma that sutures did not functionate. The cause of the subsequent peritonitis is revealed at autopsy.

12. *They determine faulty operative technical causes of death,* i. e., unintentional ligation of ureters or ligation of necessary intestinal blood vessels or improperly placed intestinal anastomoses causing death are revealed at autopsy.

13. *They assist in determining causes and methods of surgical infection,* i. e., routine bacteriologic examinations of operative wounds, operative materials, contents of operated organs or tissues lead to a better control over possible infections.

14. *They assist in clinical, surgical, and laboratory research.*

These simple examples are but a few of many instances of the relationship of laboratory procedures and judgment to efficiency in the practice of medicine. In this series each patient averaged 4.2 laboratory reports each of which represents usually many examinations. Of these reports 45 per cent were of necessity microscopic examinations. The figures represent the relationship of the pathologist to general patients and may be supplemented by the following figures illustrative of the relationship of tissue pathology alone, to diagnosis and surgical operations.

Of the 49,083 registered patients, 22.7 per cent produced diagnostic and surgical tissue specimens for examination and 3.5 per cent of all patients had specimens of tissues removed solely for diagnostic purposes. Of the latter, 83 per cent were of necessity microscopic diagnoses.

In the series of operative patients during the same period there were 11,149 tissue reports made, 16.7 per cent of which were of necessity microscopic examinations. This figure varies from 15 per cent to 30 per cent in different series which have been studied from year to year. Of the last 14,167 operative cases which produced tissue specimens (61 per cent of all operative cases) 20 per cent required a necessary microscopic diagnosis although all specimens were examined microscopically routinely.

In conclusion it should be stated that the statistics which have been briefly presented here should be sufficient to show the medical profession that laboratory methods which were formerly considered principally of postmortem and research interest have become an essential part of efficient routine practice of medicine.

ENCEPHALITIS LETHARGICA

By C. M. Stafford, A.M., M.D., Detroit, Mich.

IN THE April issue of this Journal Vaughan gives a most thorough synopsis of what has recently appeared in current medical literature concerning a new syndrome known by the name of "encephalitis lethargica."

This peculiar and apparently rather rare disease, according to the observations of practically every one who has come in contact with it, is characterized by apathy and drowsiness, sometimes amounting to real coma, as its main features. Other symptoms vary in different cases and include palsies of the third pair of cranial nerves, meningismus, general bodily rigidity, urinary retention, cyanosis, restlessness, delusions and hallucinations, accompanied by mild fever.

The mortality seems to be about 50 per cent. Postmortem, the findings are quite typical. Macroscopically, there is congestion of the meninges and scattered hemorrhages in both white and gray matter. Microscopically, there is found a small-celled infiltration, especially marked about the blood vessels and occurring most numerously in the medulla, pons, and basal nuclei.

The etiology of the condition has not yet been definitely established. From its incidence on the heels of the recent pandemic of influenza, many have thought it to be a peculiar manifestation of this waning infection. By others it has been variously ascribed to a lowered resistance following a previous attack of influenza or as a manifestation of botulism. In favor of its influenzal relationship may be cited its occurrence in its present epidemic form just after we have gone through a world-wide epidemic of influenza. In support of this theory also are the reported epidemics of the symptomatically similar diseases known as "Nono," occurring in the spring of 1890 in Northern Italy and Hungary and here and there throughout Europe, and the "Tübingen sleeping sickness" of 1712, both of which followed pandemics of influenza, and the fact that many patients have given a history of recently having had influenza. Against its direct connection with influenza, however, it may be said that many of the persons affected by this lethargic disease give no history of having had influenza.

Blood counts do not reveal a disturbance of the normal cellular relationships either as to numbers or morphology. The urine is negative. The blood Wassermann is likewise negative. The spinal fluid findings, however, have been rather constant. The fluid very uniformly is found to be under increased pressure and escapes from the cannula in a jet or with rapid dropping. Examined by the Wassermann reaction it is found to be negative. The globulin is increased as are also the cells, the latter averaging from 10 to 100 per cu. mm. and are of the lymphocytic type.

That the condition is due to a definite infection of some kind or other would seem most probable. In January, 1919, the London Board of Health made this disease reportable in the belief that it is infectious in character. Indeed, von Economo, who by his monograph has given the subject more thorough study than any other, states that the virus is nonfilterable through Berkefeld filters,

differing in this respect from that of poliomyelitis. He states also that the disease can be transferred to apes, and von Wiesen succeeded in isolating a diplostreptococcus from such an infected ape which he believes to be the cause of the disease. So far as I have been able to ascertain, however, this organism has not been isolated directly from the human.

On March 23, last, I was called to see my first case of this kind. The patient, a man 36 years of age, a German by birth, and a mechanic by occupation, married, and the father of four children, had taken to his bed ten days previously. The wife furnished me with quite a complete history which he himself corroborated. Up to the present time, aside from "colds," he had never had any illness to speak of since childhood. He had not had influenza, neither had any one in the household had it.

On March 13, following several days of malaise, he had taken to his bed because of the increasing languor. On March 15, he began to complain of pain over the region of the left frontal sinus, from whence it radiated over his scalp. On the 17th, the pain in the head still continued, but he also began to have severe pain in the left arm and over the manubrium. On the 20th, the pain had extended into the right arm also.

I had been called on the evening of the 23d. My entry into the room was unobserved by the patient who lay sleeping with occasional paroxysmal twitchings of the hands, fingers, and arms. His breathing was quiet save when interrupted by some quiet, incoherent exclamation. His wife stated that he had been talking in this way for the past two days. His general appearance was that of a not-very-robust man. The skin, lips, and finger nails were slightly cyanotic. The patient roused from his lethargy upon being shaken and spoken to rather loudly. He immediately began to complain of intense pains in both arms and in his chest and stated that he could not sleep. No sooner were the words out of his mouth, however, then he lapsed into sleep again. Evidently, the pains were not sufficient to keep him from sleeping, although he protested that he could not stand the pain and could get no sleep. Examination showed a regular pulse of good volume with a rate of 80. The temperature was 100° by mouth. The pupils were somewhat miotic, regular, and sluggish, but responded to light and accommodation. There were no ocular palsies or rigidity of the neck or extremities. Kernig's sign was negative. Cutaneous and deep reflexes were sluggish.

On March 25, I had him removed to St. Mary's Hospital for observation. There the somnolence continued, although on arousing him he always complained of pain and plead for something to relieve him and make him sleep. On March 25, in the evening the temperature was 99.4°, pulse 76. On the 26th, in the morning it was 100.2°, pulse 82; in the evening, 98.2°, pulse 70. During the next five or six days the temperature oscillated from normal to 100°, but was irregular in type, sometimes up in the morning and down at night and vice versa. After this time the temperature remained normal.

Examination of the urine was negative. A blood count made April 1 showed erythrocytes 4,100,000; whites 8,000. Differential white count showed polymorphonuclears 60 per cent, small mononuclears 21 per cent, large mononuclears 14 per cent, and eosinophiles 5 per cent; hemoglobin 90 per cent; color index .9. A Wassermann of the blood, taken March 31, gave an 0-0-0 reaction.

On April 4, a spinal puncture was made. The fluid was under increased tension, running very freely from the cannula instead of dropping as in the usual case. The fluid was clear with a number of small whitish flocculi. A Wassermann of the spinal fluid was negative; cell count 60 per cubic millimeter and of the lymphocytic type with increased globulin by the Ross-Jones and Pandy methods. With the escape of the first 15 c.c. of spinal fluid, the patient moved his head and said that the pain in his chest and arms had disappeared. Twenty cubic centimeters of spinal fluid were removed. The somnolence was also improved by the puncture, but both pain and somnolence had regained their former status within 48 hours. On April 7, a second spinal puncture was made with similar results, namely, relief of pain, the spinal fluid under pressure, and similar cytologic and globulin findings. April 15, a third spinal puncture was made and on this occasion the fluid was found to be under average normal pressure and of normal macroscopic appearance. A cell count and globulin estimation showed no increase and on April 19 the patient was able to leave the hospital, although still complaining of some pain in the chest and arms and of great weakness.

The highly interesting point in relation to this case is in regard to the bacteriologic findings of the specimens of spinal fluid. A smear of the centrifugalized sediment of the first puncture showed, in addition to lymphocytes, a number of rather large diplococci. Cultures were made on ascitic agar, Loeffler's media, blood agar, and in ascitic broth, but with negative results. So much time was lost in making these cultures that we felt the organism observed had probably been lost. The fluid from the second spinal puncture also showed, under the microscope, this same diplococcus, but cultural attempts in these same aforementioned media were likewise negative. In an endeavor to secure a culture at any cost, both the first and second specimens of spinal fluid were placed in the incubator overnight at 37.5° C.

The following morning numerous minute flocculi were observed throughout both tubes. They were placed in the centrifuge and thrown down. By inoculating ascitic agar slants with this centrifugalized sediment a sparse growth was obtained, which increased as it was repeatedly transplanted. The organism grows rather poorly on plain agar. The colonies on this media resemble streptococcus colonies, except that they are more delicate and slightly smaller.

The organism is a Gram-positive diplococcus, frequently occurring in short chains of three or four loosely-joined cocci. It stains, but rather poorly, with all common laboratory dyes, some organisms being deeply stained and others lightly. It produces no capsule. In smears from 48-hour cultures, it was observed that the chains show a tendency to divide longitudinally, i. e., a distinct and continuous cleavage can be noted, extending throughout the length of the short chain of cocci. This probably accounts for the clusters of organisms, resembling staphylococci, which are commonly encountered in smears from older cultures.

Growth on blood agar plates did not produce any hemolized areas or greenish zones. The inoculation of a guinea pig intracardially with one-half the growth on an ascitic agar slant failed to produce any ill effects. A rabbit, inoculated intravenously with two large doses, 7 days apart, the first consisting of the growth of one ascitic agar slant suspended in saline solution and the sec-

ond the suspended growth of three agar slants, apparently developed no illness, but the presence of agglutinins was demonstrated. Another rabbit inoculated intraspinally with the growth from an ascitic agar tube suspended in salt solution showed no ill effects.

The following results were obtained from 24 hours of growth on the media tabulated:

Medium	*Acid*	*Gas*
Litmus Milk	No	No
Nutrose Broth	No	No
Saccharose Broth	Yes	No
Levulose Broth	Yes	No
Mannite Broth	No	No
Lactose Broth	No	No
Glucose Broth	Yes	No
Inulin Broth	No	No

The growth on ascitic agar is slightly heavier than the ordinary streptococcus growth and somewhat whiter. The culture is being kept alive by frequent transplantations and with repeated transplantation has become heavier, so that macroscopically it now no longer looks like a streptococcus growth, nor is it so heavy as a staphylococcus growth. Under the microscope its morphology has not changed.

We have not yet determined its pathogenicity for apes, but hope to determine this point in the near future. Pending this determination we can only state that in two successive withdrawals of spinal fluid from this case of epidemic encephalitis, a diplo-streptococcus was isolated in pure culture.

LABORATORY METHODS

SOME NEW APPARATUS—A COMBINATION TAMBOUR AND MEMBRANE MANOMETER AND A MODIFIED SPRING MANOMETER*

By D. E. Jackson, Ph.D., M.D., Cincinnati, Ohio.

In 1891 Hürthle[1] described a membrane manometer of which various modifications have since been made. The combination here described is designed to save expense, and at the same time to furnish a membrane manometer of great sensitivity, and with a wide range of adjustments. This is accomplished by using one base stock with removable bowls for both tambour and manometer. In Fig. 1 the instrument is shown complete as used for recording blood pressure. The manometer bowl can be adjusted back and forth to change the magnifica-

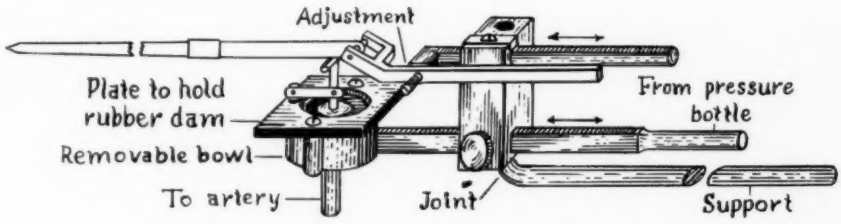

Fig. 1.—Combination tambour and membrane manometer (arranged as a manometer).

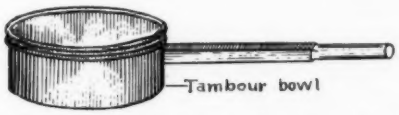

Fig. 2.—Extra bowl to be substituted when the instrument is used as a tambour.

tion of the tracing, or the bowl can be removed from the base stock entirely and a special tambour bowl (Fig. 2) can be substituted in its place, thereby forming a complete tambour. Three different sizes of tambour bowls are provided so that the instrument can cover a very wide range of work. The rubber membrane of the manometer bowl is held in place by a thick metal plate which is attached to the bowl by two small screws. When these screws are removed the plate can be lifted up and a new membrane inserted. A large circular opening cut in the center of the plate permits the lower surface of a small circular disc to rest on the the rubber membrane. Attached to this disc is the special lever mechanism which transmits the impulses reaching the interior of the bowl to the writing lever. The mechanism to which the writing lever is hinged can also be readily adjusted in two directions, back and forth and up and down.

*From the Department of Pharmacology of the University of Cincinnati Medical College, Cincinnati, Ohio.

A further very serviceable feature which the instrument possesses is involved in the manner of the attachment of the supporting rod to the base stock. The end of the supporting rod is turned upward at an angle of ninety degrees at the point of its insertion into a one-fourth inch hole passing perpendicularly through the base stock. A set screw (not seen in the figure) firmly clamps the tambour on the supporting rod. Thus the tambour may be rotated to any desired angle in a horizontal plane. This is frequently a great convenience when one desires to arrange a number of instruments to write simultaneously on a drum.

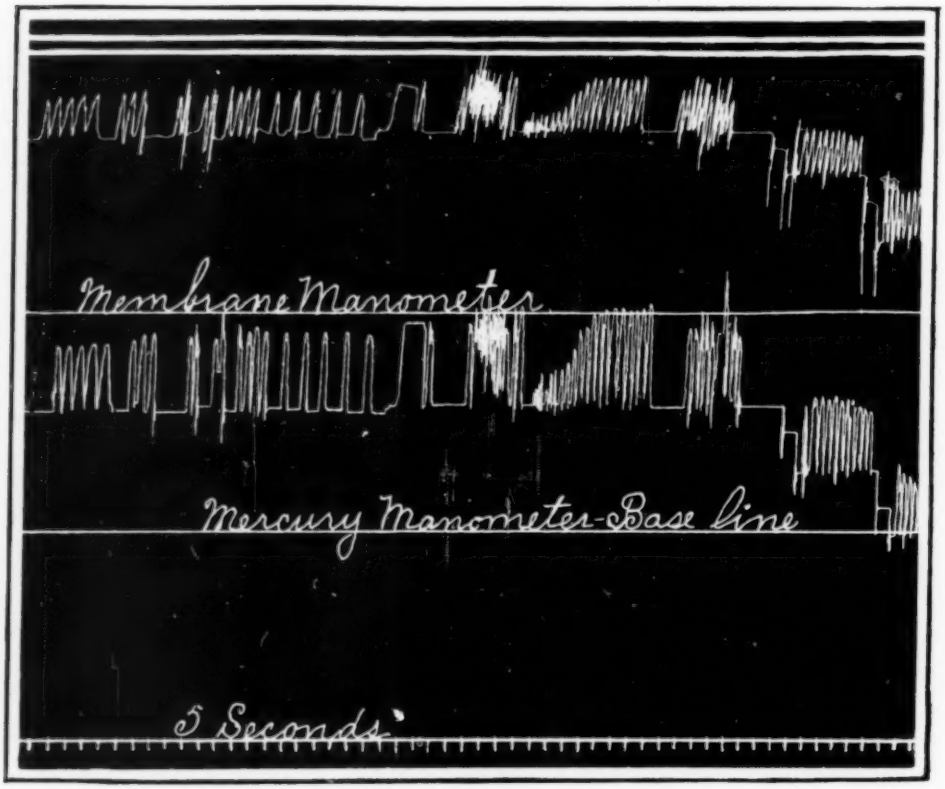

Fig. 3.—Tracing made mechanically to show the comparative action of the membrane manometer and a mercury manometer.

Fig. 3 shows a tracing in which the upper pressure curve was made by the membrane manometer, while the lower pressure record was made synchronously with a mercury manometer, both instruments being directly connected together by rubber tubing. In this manner the membrane manometer can easily be calibrated. The curves here shown were made by mechanically varying the pressure by hand simultaneously in the two manometers.

Fick[2] described a special form of spring manometer in 1864. The instrument shown in Fig. 4 is considerably modified from the original Fick design, and is also simpler in construction. This instrument is made of brass and the parts are soldered together. Consequently mercury must not be allowed to come

into contact with the manometer as the formation of the mercury amalgam would destroy the instrument. And it is also desirable not to allow strong solutions of sodium citrate or sulphate to stand for long periods in the instrument as these salt solutions tend to slowly decompose the solder.

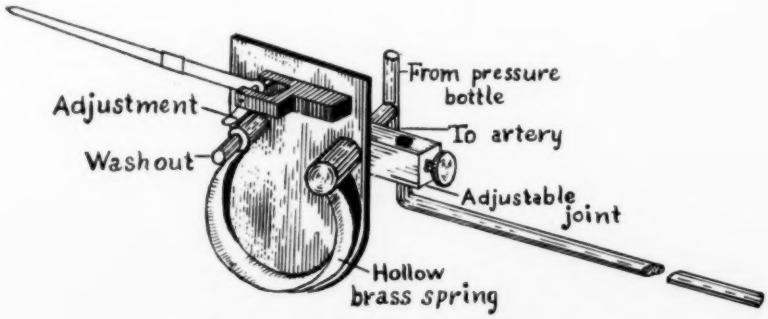

Fig. 4.—Modified Fick spring manometer.

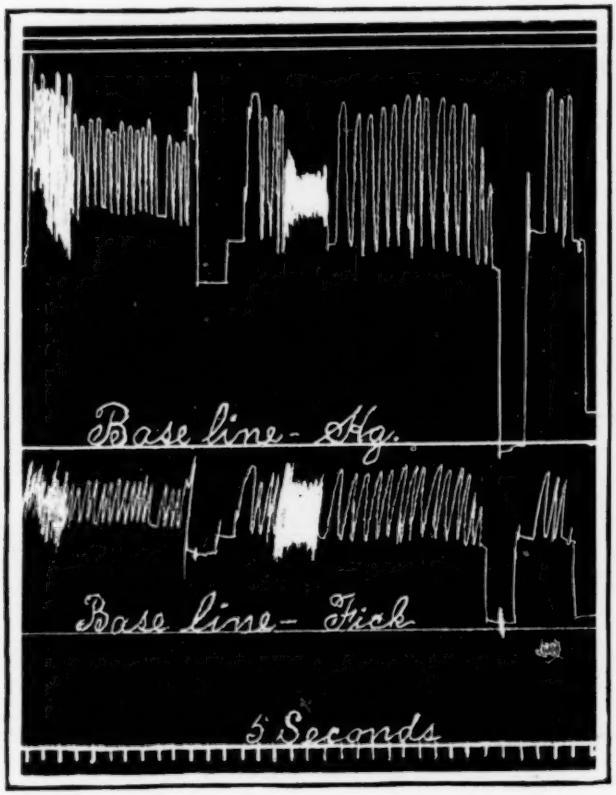

Fig. 5.—Tracing made mechanically to show the comparative action of the spring manometer and a mercury manometer.

At the rear of the instrument is a T-tube, the straight side of which stands perpendicularly. The upper end of this tube connects with the pressure bottle, while the lower end attaches to a tube leading to the artery. The side arm of the T-tube passes through the instrument into a hollow cylinder attached to the

front side of the manometer. From this cylinder a large, flattened, curved, hollow spring made of very thin brass passes circularly around the lower part of the instrument. At the opposite end of the spring is attached a second smaller hollow cylinder from which a washout tube extends. The purpose of this washout tube is to allow the anticoagulating solution to be passed through the instrument and thus displace the air before connecting the manometer to the artery. A small rubber stopper is used to close the end of the washout tube.

The magnification by the writing lever can be controlled by shifting up and down the end of the block to which the lever is hinged. This is accomplished through the action of a set screw (not seen in the figure) which passes through the instrument from the rear. The manometer can be rotated to any desired angle in a horizontal plane by means of the special method of attaching the supporting rod.

Fig. 5 shows a tracing taken simultaneously with the spring manometer (lower curve) and a mercury manometer (upper curve), both instruments being directly connected together by means of rubber tubing filled with salt solution. The tracings were made by mechanically varying the pressure in the two manometers by hand. In this manner the spring manometer can easily be calibrated.

These instruments can be obtained from the Max Wocher & Son Co., of Cincinnati, Ohio.

BIBLIOGRAPHY

[1]Hürthle: Arch. f. d. ges. Physiol. 1891, xlix, 45.
[2]Fick: Arch. f. Physiol., 1864, p. 583.

EXPERIENCES IN THE PURCHASE OF BASIC FUCHSIN*

By F. L. Mickle and M. B. Sherwood, New Haven, Conn.

EXPERIENCES encountered by this laboratory in purchasing basic fuchsin are here recorded in an effort to learn whether similar difficulties have been encountered by workers in other laboratories.

In March, 1918, one hundred grams of basic fuchsin were purchased from a well-known chemical supply house for use in the preparation of Ziehl-Neilsen carbol-fuchsin staining solution for demonstrating tubercle bacilli in sputum. From this stain a carbol-fuschin solution was prepared which appeared to be of proper concentration and which stained well. However, on standing over night a heavy precipitate settled out, leaving a thin, red, supernatant liquid entirely unsatisfactory for staining tubercle bacilli. Repeated attempts to prepare solutions from this fuchsin gave similar results and the stain was returned to the supply house. They found, upon testing it, that the amount of "salt" used in the process of manufacture was "beyond comprehension." One hun-

*From the Bureau of Laboratories, Connecticut State Department of Health.

dred grams of basic fuchsin crystals were furnished in replacement. This crystalline fuchsin precipitated from solutions much as the first had done.

An order was placed with another firm for two hundred grams of basic fuchsin which they guaranteed in the following terms:

> "These are not Grubler's stains, although they are of imported stock. These stains were imported from Germany some time ago in bulk, and came from the same source of supply as the Grubler stains.
>
> "We will guarantee the results produced to be equal to the Grubler, or otherwise the stain may be returned for credit. We have already supplied a large quantity of this stain to a number of laboratories and the reports received are very favorable."

This stain was similar in appearance to the last lot purchased from the other firm and was contained in jars of the same type with identical labels. The company selling this stain had pasted a label with their name and address over the portion of the label where the name of the other firm had appeared.

These last two lots of fuchsin were mixtures of a powdered stain with coarser crystals. It was noticed that the crystals were not readily soluble in alcohol. The product secured from the first supply house was then sifted through ordinary sand sieves and sixty per cent (crystals) was caught on the twenty-mesh sieve, five per cent was retained on the forty-mesh, and the balance passed the forty-mesh. The stain from the other firm gave a similar result. Fifty-one per cent (crystals) failed to pass the twenty-mesh sieve, five per cent was retained on the forty-mesh, and the balance passed this sieve. The crystals retained on the forty-mesh sieve were somewhat soluble in water but practically insoluble in alcohol. Washed free from a coating of the fine powdered stain, they proved to be white. A solution of them, when inverted with hydrochloric acid, reduced Fehling's solution. The polariscope showed that they were crystals of sucrose. The powdered stain passing the forty-mesh sieve appeared to be basic fuchsin and was satisfactory for staining the tubercle bacillus.

The above results were reported to both firms and they have given credit for the stains. One of the firms stated that this product had been obtained from a manufacturer at various times over a period of many months. The original had been found by test to be thoroughly reliable and apparently an unsatisfactory stain had been substituted later by the manufacturer.

A METHOD FOR MAKING GLASS ARTERIAL CANNULAS*

By John A. Higgins, Chicago, Ill.

A PROBLEM, which no doubt is of much concern to the laboratory research worker as well as the pharmacology or physiology instructors, is to be able to keep on hand, or construct at will, an adequate supply of glass arterial cannulas of various sized arterial openings. Heretofore this problem has been looked upon as a rather technical matter and difficulties have been experienced in locating, either directly or indirectly through an apparatus supply house, a skilled glass blower.

The comparative ease experienced, especially at the hands of students, in breaking off the arterial section of the cannulas only adds to the supply problem. This inconvenience experienced of having glass arterial cannulas broken

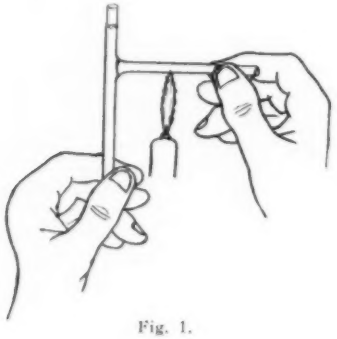

Fig. 1.

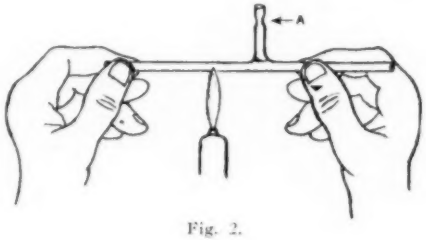

Fig. 2.

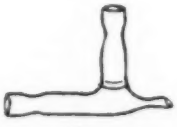

Fig. 4.

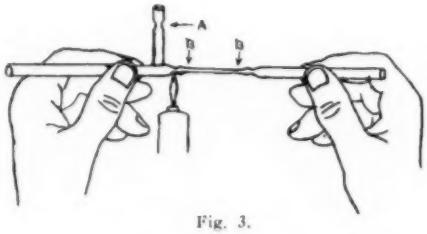

Fig. 3.

off at the arterial opening, can, of course, be overcome by constructing cannulas from brass material. The brass constructed cannulas, however, do not always appeal to the laboratory workers as a substitute for the glass arterial cannula.

While the glass cannula may seem rather difficult for the average person to make, it is possible to make suitable arterial cannulas from glass T-tubes. The most suitable are perhaps made from T-tubes measuring 3 by 6 inches long and with a ¼ inch, inside diameter, opening.

The short, or 3-inch section of the T-tube is rotated with the right thumb and fingers in a relatively low blast flame, about two inches from the opened end. When the glass tubing shows signs of softening, at the heated section, then grasp one end of the long, or six-inch, section of the T-tube (see Fig. 1) with the left hand and gently pull apart with both hands leaving a sort of groove

*From the Department of Physiology, University of Illinois School of Medicine, Chicago, Ill.

as shown at *A* Figs. 2 and 3. Some workers do not consider such grooves in a cannula essential, while others utilize them to tie on rubber tubing and thus eliminate connections being separated while under arterial pressure. A filed line is now made around the short length of the T-tube, about 1¾ inches from the opened end. Break off the excess tubing at this point. A second groove it made on one side of the side outlet junction as shown in Fig. 2. The excess tubing need not be eliminated from this section of the cannula as yet. On the ungrooved section of the T-tube, and close to the point where the tubes are connected, gently heat and draw the glass in the same fashion as for making straight cannulas, the opening of this arterial end of the cannula, depending on the length at which the heated tube is drawn out.

Shoulders are now placed on the smaller ends of the drawn tubes, as shown in Fig. 3, using a small needle-like flame. Fig. 3 shows the possibility of getting a straight, as well as an arterial, cannula from the same T-tube. The cannulas are now separated by filed marks, at points *B* Fig. 3, also excess tube ends are now marked with a file and broken off. The angles of the small opening of the cannulas are determined, on a fine grinding wheel, according to personal views. Now heat all edges of the cannulas gently to eliminate any sharp cutting edges. A finished arterial cannula is shown in Fig. 4.

Some laboratory workers seem to be of the opinion that a bulb, at the junction of the cannula proper and the side outlet, is essential to lessening coagulation of the blood, the basis for such view being that the bulb acts as a sort of mixing chamber for the blood and the anticoagulant solution. While such an opinion is perhaps a logical point to bear in mind, still I am inclined to believe that the factor mostly involved is not the presence of a bulbous junction but a proper concentration of a good anticoagulant solution.

The Journal of Laboratory and Clinical Medicine

VOL. IV. AUGUST, 1919 No. 11

Editor-in-Chief: VICTOR C. VAUGHAN, M.D.
Ann Arbor, Mich.

ASSOCIATE EDITORS

DENNIS E. JACKSON, M.D. - - CINCINNATI
HANS ZINSSER, M.D. - - - NEW YORK
PAUL G. WOOLLEY, M.D. - - CINCINNATI
FREDERICK P. GAY, M.D. - - BERKELEY, CAL.
J. J. R. MACLEOD, M.B. - - - TORONTO
ROY G. PEARCE, M.D. - - - CLEVELAND
W. C. MACCARTY, M.D. - ROCHESTER, MINN.
GERALD B. WEBB, M.D. - COLORADO SPRINGS
E. E. SOUTHARD, M.D. - - - - BOSTON

Contents of this Journal Copyright, 1919, by The C. V. Mosby Company—All Rights Reserved

Entered at the Post Office at St. Louis, Mo., as Second-Class Matter

EDITORIALS

The Red Cross as an International Health Agency

RECENTLY the Red Cross organizations of the United States, Japan, England, France, and Italy held a conference at Cannes, France. This conference was attended by men eminent in sanitation and epidemiology from the countries above mentioned. It was supposed at the time that this meeting would be a preparatory one to an international Red Cross conference to be held at Geneva soon after signing the treaty of peace. However the treaty is still in the air, and it may be of general interest to know what was done at Cannes.

Doctor Richard P. Strong proposed that the International Red Cross Societies should inaugurate a movement for the establishment of an organization which will take up the most urgent problems in hygiene and public health and attempt to solve them in the most intelligent manner. He proposed the establishment of a Red Cross International Council and Bureau of Hygiene and Public Health whose principal activities should be as follows:

(1) To call attention to the most urgent and important situations in different parts of the world where medical or sanitary relief is needed, and to the best methods to be employed in extending such relief and by whom it is advisable that such relief should be offered.

(2) To stimulate investigations in relation to problems in public health and carry on original research by the appointment of such commissions when such investigations seem urgent, advisable, and necessary.

(3) To demonstrate and exhibit new discoveries and new methods in combating infectious disease, and methods relating to hygiene and public health.

(4) To collect all important information relating to public health and new methods for the prevention and control of outbreaks of infectious diseases.

(5) To secure accurate knowledge concerning public health institutions, schools, and laboratories, in various countries and the work performed therein.

(6) To standardize and improve public health education throughout the world.

Doctor Strong says: "We may suppose that an epidemic of plague has appeared in Greece, that the disease is spreading rapidly and has passed beyond the control of the local authorities. All countries are menaced from this quarter. Greece calls for aid from other nations as did Serbia when she was stricken with typhus in 1915. The Red Cross in different countries wishes to respond, but without a central international bureau the efforts can not be best coordinated and made most effective. We will suppose that the British Red Cross hastily organizes relief units without reference to what other countries may be planning or undertaking. The French, Italian, and Japanese Red Cross organizations act in the same manner. Other countries follow their example, each unfamiliar with the plan of the others or with the nature of the personnel and equipment to be sent. These units arrive in Greece, each with a more or less indefinite plan of action and with its own commanding officer. The local sanitary authorities having already failed in the suppression of the epidemic are not in a position to assume control. Such a condition actually occurred in Serbia in 1915. Unless some individual who can dominate the situation takes control, confusion, lack of cooperation and inefficient management, or failure is likely to result. At any rate it must be obvious that the most efficient work can not be done unless all the relief units act in cooperation under a central direction and with a definite plan. With the existence of an International Council and Bureau of Hygiene with its machinery for obtaining early information the national Red Cross of each nation could be informed of what it was expected to do, and just what form of relief seemed most desirable and necessary. Methods of procedure could be planned by this body. An interallied board would take charge of the situation and constitute a Bureau of Health in the afflicted country and be able to carry out the task before it in an intelligent manner."

In support of his plan Doctor Strong refers to the successful study of trench fever in the spring of 1918. A commission was appointed to carry out experimental work upon this disease and volunteer subjects were secured. Through this interallied cooperation between the British and American armies the work was successfully accomplished and the method of transmission of this disease discovered. The work was made possible largely through an interallied commission which was appointed on account of the war. In time of peace there would have been no arrangement for similar cooperation, and this should be provided for.

The handling of pneumonic plague in Manchuria in 1910 is another illustration. China became seriously alarmed at the situation, appealed for assistance, and the American Red Cross under the authority of the State Department responded to the appeal. The true nature and method of spread of the disease were determined by several scientific commissions sent by different nations to Manchuria. The proper measures were instituted, the epidemic checked, and entirely stamped out within three months.

Doctor Strong makes clear that the chief activities of the International Council and Bureau in relation to research should be upon the whole not to prosecute original investigations except in special instances, but to stimulate research work in scientific institutions already established in different parts of the world, either by securing to such institutions financial support for such studies or by furnishing increased personnel or by rendering other assistance.

It is proposed for the purpose of carrying out this project that there be established in connection with the League of Nations an International Bureau of Hygiene and Public Health situated in the same city as the capital of the League of Nations. There should be maintained: (1) An office, (2) A division of information, (3) A library division, (4) A publication division, (5) A demonstration laboratory, (6) A museum.

There should also be established in connection with the central bureau departments of: (1) Vital statistics, (2) Prevention of communicable diseases, (3) Sanitation, (4) Industrial hygiene, (5) Child welfare.

The international council should meet every four months in one of the allied countries, and annually at the place in which the central bureau is situated. There should be an executive committee composed of one representative from each country. The director of the bureau should be the chairman of the International Council of Hygiene and Public Health. At least one public health official in each country should maintain an office in connection with the national Red Cross. The International Bureau of Hygiene and Public Health described above should constitute a center where questions of common interest to all humanity would be considered. In this way the duplication of public health activities especially in relation to epidemic diseases should be avoided and greater harmony and more forceful action obtained through the employment of unified and most modern sanitary methods. The bureau will not attempt to duplicate or supplant the work of medical and hygienic institutions already established in different countries, but will attempt to further their interests while utilizing their discoveries. In this way it will constitute an international center of ideas, methods, exchanges, relations, propaganda, etc.

The central Bureau of Hygiene will receive the following information:

(1) All new discoveries and methods of importance in relation to public welfare.

(2) All vital statistics.

(3) Information concerning the prevalence of communicable diseases.

(4) Knowledge concerning special sanitary and hygienic problems in different countries.

The bureau will also act in the distribution of the following:

(1) New discoveries and new methods in relation to hygiene and public health.

(2) Facts concerning the objects, work being performed, and personnel in all public health laboratories.

(3) The text of all national health laws.

(4) All valuable information resulting from a codification of proceedings of health congresses in order that such information may be widely disseminated and rendered available.

The collections of the central International Bureau of Hygiene and Sanitation will consist of a museum, a library, and laboratories. The purpose of the museum will be to demonstrate the progress accomplished in fields of hygiene and public health and to accentuate the importance of discoveries. Models of new available sanitary appliances would be on constant exhibition in the museum. The library should be one for reference, made up largely of journals, periodicals, and monographs. It should be a depository of duplicates of all valuable hygienic publication. Writers upon sanitary subjects should be urged to send their works to this library. The International Hygienic Bureau with its laboratories, library, and museum, with its large collections, should attract workers interested in these subjects from all parts of the world.

It is to be hoped that the Red Cross societies of the various nations that are to constitute the much-discussed League will cooperate and realize something like the plan proposed by Doctor Strong. In this country at least the Red Cross has a great hold upon the people. This has been demonstrated as never before during the war. It has asked for millions and its requests have been duplicated in gifts. If wars happily cease, which is by no means certain at the present writing, there could be found no stronger bond for union between the nations than a common struggle against that enemy of all mankind, disease, and especially epidemic disease. Today we scarcely know the A, B, C's of the science of epidemiology. The time may come when we shall be able to foretell the oncoming of an epidemic with much more certainty than the weather of tomorrow or of next week is now foretold. Besides, when this time comes we shall not only be able to predict the oncoming storm, but we shall be able to greatly mitigate, and possibly altogether avert it.

Centuries ago it was known that epidemic diseases traveled from east to west. This was formulated as an epidemiologic law even before the dawn of the Christian era. It was not then realized that the direction of travel of epidemics was determined by the line of human travel. This is now known to be true. The early epidemics of Asiatic cholera during the first part of the nineteenth century contributed greatly to our epidemiologic knowledge. In 1816 this infection began its first recorded travels and reached countries so remote it could be regarded as pandemic. It traveled slowly at that time before the general use of steam transportation, and did not extend westward beyond the confines of Asia and Africa. To the east and south it visited Borneo, Java, the Philippines, and China. It lingered in various localities for years. In 1826 it began from its home near the delta of the Ganges its second journey. This continued for eleven

years. This time it spread over the greater part of Europe and America. It traveled by different routes, some by land and some by sea. Nothing more was known of this infection outside its own domicile until 1846. The third pandemic reached the farthermost parts of the earth and lasted until 1862. It is estimated that in 1853-54 it killed in France alone 150,000 and it pursued the gold-seeker on his way across the plains to California. The fourth pandemic was in evidence by 1864 and continued until 1875. As the records show, it found 114,683 victims in Prussia alone on this trip. The fifth pandemic began in 1883, spread over the eastern hemisphere and reached New York harbor, but was refused admission. This time the number of victims in European Russia alone is estimated at 800,000. The notable outburst at Hamburg belongs to this period. In 1902 cholera became pandemic for the sixth time. Since that time it has been found in various parts of Europe and has repeatedly reached our own shores, but has never been naturalized. During the great World War it has put in an appearance here and there, but scientific preventive medicine has been able to control it.

In all these excursions, among all kinds and conditions of men, in every degree of civilization, in the tropics of Africa and amid the snow and ice of northern Russia, in the thronged city, and in the emigrant's wagon, with high and low, slave and master, wherever it has traveled, cholera has maintained its individuality and has shown no modification in manner of attack or variation in the symptoms induced in its victims. Its vehicle of transport has been man's body and it has followed the lines of human travel, on foot, on horse or camel, by ox team or stage, by steam on land and sea. The sick and dying have scattered its progeny around the world. The science of preventive medicine has proved the only detective who can trace this criminal, the only officer who can arrest, and the only executioner who may finally remove it for all time from the earth.

What has proved true concerning cholera is largely true of influenza. Even now it has reached the uttermost parts of the earth.

—*V. C. V.*

An Addition to Our Editorial Staff

IT is with pleasure that we welcome to our editorial staff Dr. W. C. MacCarty of the Mayo Clinic. We consider ourselves fortunate in securing the help of this eminent man.

The objects which Dr. MacCarty will attempt to secure in the conduct of his department may be stated as follows:

1. To keep the medical profession posted up to date as to the clinical value of laboratory procedures and the conclusions to be drawn therefrom.

2. To attempt to standardize pathologic terminology and make it more efficient. In doing this he will avoid making unduly prominent his own views, but will treat the subject in a broad way.

3. To stimulate physicians to take up laboratory methods as an essential part of the practice of medicine.

4. He will endeavor to encourage the utilization of laboratory specialists as consultants to those directly engaged in the practice of the profession.

—*V. C. V.*